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How do Attributes of a Leader's Authenticity Affect Performance in a Bank Setting? A Mixed Method Survey of Commercial Banks in Kenya

Evelyne Muriuki¹, James M. Kilika², Robert G. Muigai³

¹ Doctoral Researcher, School of Leadership, Business and Technology Pan Africa Christian University

² Senior Lecturer, School of Business, Economics & Tourism, Kenyatta University

³ Senior Lecturer, Kirinyaga University

Correspondence: Evelyne Muriuki, School of Leadership, Business and Technology Pan Africa Christian University, Nairobi Kenya Tel: +254722373848. E-mail: evelyne.muriuki@students.pacuniversity.ac.ke

Abstract

The primary purpose of this paper was to examine how the attributes of a leader's authenticity affect the performance of commercial banks in Kenya. The study adopted a convergent parallel mixed methods design for the purposes of data collection where the researcher simultaneously collected quantitative and qualitative data and analysis done separately before merging the results. Data was collected from 352 commercial bank leaders in Nairobi, Kenya, while interviews with 15 selected senior management provided in-depth understanding to the constructs. Quantitative data was analyzed using SPSS to test the hypothesis while Atlas.ti 7 software used for qualitative analysis. The main findings of the study demonstrate that the attributes of balanced processing and internalized moral perspective have been deployed to a high extent while relational transparency and self-awareness have been deployed to a moderate extent. Balanced processing and relational transparency have a significantly positive influence on performance of commercial banks since they are essential for problem solving, consultation and communication. Relational transparency also leads to better performance since there is an adaptive and collaborative organizational culture. The results were not significant where internalized moral perspectives were deployed due to the accountability and transparency structures being subject to the values set by the composition of the board of directors and ownership. The study concluded that authentic leadership is seen as the cornerstone and key driver of organizational performance which is practiced from a moderate to high extent in commercial banks in Kenya thereby influencing performance. The study recommends that commercial banks should focus on leadership development programs that encourage the attributes of leader's authenticity as they foster collaborative and consultative leadership as well as operation within flatter organizational structures in these dynamic times that facilitate agile decision making.

Keywords: Authentic Leadership (AL), Performance, Authentic Leadership Questionnaire (ALQ), Authentic Leadership Development (ALD)

1. Introduction

In organizational behavior studies, leadership has got to be the most debated, published and researched topic with exponential growth in the work of many scholars and academicians (Ererdi & Durgun, 2020; Northouse, 2021;

Rost, 1991). A literature search on the concept of leadership reveals that different traits, behaviors, abilities, sources of power or situational aspects are factors that determine the leader's level of influence on the followers (Yukl, 2020). Leadership is a very highly priced and sought-after competence in organizations today as many people believe it can change the quality of their personal, social and professional lives (Northouse, 2021). Leadership is an art of making things happen by exerting intrinsic and extrinsic influence on followers (Igbaekemen & Odivwri, 2015).

Leadership plays a pivotal role in the banking sector; the governance structures bestow leadership on the board and senior management. The Kenyan Banking Act (2013) defines Corporate Governance as the way in which the board and senior management govern the business dealings of the institution. The framework and the means of setting and attaining company objectives and monitoring performance are also provided. The Central Bank of Kenya is the regulator charged with oversight and uses prudential guidelines to define the role requirements of the leadership. This includes providing ethical leadership based on integrity and ascertaining that banking activities do not deviate from the set strategy (Osebe & Chepkemioi, 2016). The senior leadership made up of the executive is led by the Chief Executive Officer whose direct reports are the directors in charge of various units such as business development, operations and technology, human resources and marketing among other functions. The heads of departments report to the directors and serve as the middle managers who in turn have junior managers who oversee the staff on the shop floor or banking halls. The organization structures are, however, getting leaner as there is a lot of emphasis on the staff taking leadership at all levels with even tellers being required to take up individual responsibility for business growth (Gautam & Malla, 2013).

Authentic leadership has evolved over time as the 21st century leader cannot use the command-and-control approach popular in previous centuries (Celik et al., 2016). It is regarded as among the newer parts of leadership research and is centered on the legitimacy of the leadership. It is still in the initial stages of formation and is concerned with the genuineness of the leaders and their leadership (Northouse, 2021). Today's organizational environment has further revealed an increasing public concern into the ethical conduct of today's leader; thus, leading to the conceptualization of authentic leadership as an affirmative leadership style (Datta, 2015). Moreover, in these tumultuous and demanding times, there is a call for leadership that is genuine throughout the world (Avolio & Gardner, 2005). The scandals facing both public and private firms throughout the world have created fear and uncertainty and there is a lot of apprehension and insecurity. There is an earnest search for genuine and trustworthy leadership in addition to good, honest leaders which makes it an opportune and sensible moment in time to study authentic leadership (Northouse, 2021). The mentioned problems have created a renewed spotlight on restoration of optimism and expectation in the rapid resilience from disastrous events (Avolio & Gardner, 2005). This calls for leaders who lead from their beliefs and values, morals and principles (Avolio & Luthans, 2006) which are essential to the banking system that plays a role as financial intermediaries based on public trust.

1.1 Problem Statement

The current dynamic operating environment always challenges business executives to embrace the ability to sense and effectively respond to market changes, failure to which, they risk imminent demise of their firms (Saythengekeo et al., 2022). The changing environment has characterized banking operations as banks move away from the traditional brick and mortar models to more agile systems driven by market demand that call for customer convenience, while providing services at a lower cost. In the dynamic environment organizations are operating in today, an economic change in one part of the world can send shock waves in the world economic systems like the financial crises that shrouded the American banking systems in 2008 (Paraschiv, 2013). Authentic leadership is perceived as a foundation element where positive varieties of leadership are embedded and are regarded as an antidote to leadership failures and inadequacies (Zhou et al., 2014). Now, more than ever, there is a call for genuine and ethical leaders to arise where there is a behavioral change towards addressing industry issues touching on ethics and other malpractices that may lead to poor performance in the industry. Authentic leadership is deeply rooted in psychology and sociology which are both key disciplines in behavioral science suitable to explain the causes and outcomes of behavior at both individual and organizational levels (Duarte et al., 2021).

Conceptually, the state of literature on authentic leadership is exploratory and thereby the dimensions and nature of authenticity are not fully crystallized. The studies cited used descriptive design in their research on authentic leadership. A great body of empirical research has linked authentic leadership to creativity, innovation and resultant positive outcomes for the organization ranging from increased performance, leader effectiveness and team ability to deal with changing times (Alzghoul, 2018; Chimakati & Oduol, 2023; Datta, 2015; Duarte et al., 2021; Gathoni & Muiro, 2023; Grošelj et al., 2020; Lyubovnikova et al., 2017; Masimane, 2023; Mbata et al., 2023; Ribeiro et al., 2018; Sarwar et al., 2023; Schuckert, 2018; Wang et al., 2014; Walumbwa, 2008; Zhou, 2014). However, Ridderhoff (2013) investigated the influence of authentic leadership on team performance in a military setting in the Netherlands and conducted a qualitative study which does not provide the researcher with conclusive results due to a lack of statistical strength but gives better understanding of the phenomenon. Only 19 responses sampled of military leaders not including followers which can be used in future research to improve validity of results.

The review of empirical studies above on AL reveals that there is a scarcity of studies undertaken in the African/Kenyan context which reflect different macro-economic contexts, and this may be since this is a relatively novel area of study in leadership (Alzghoul, 2018; Datta, 2015; Duarte et al., 2021; Grošelj et al., 2020; Lyubovnikova et al., 2017; Ribeiro et al., 2018; Sarwar et al., 2023; Schuckert, 2018; Wang et al., 2014; Walumbwa, 2008; Zhou, 2014). They also employed different intervening variables and were not able to show the combined contribution of the attributes of a leader's authenticity to performance when tested with other leadership styles. The techniques used were either quantitative or qualitative and therefore were not rigorous enough to show the exact degree of contribution of leadership to firm performance. The study therefore addresses this gap by utilizing a mixed method approach to improve reliability and validity (Demir & Pismek, 2018). Finally, the study sought to build on these previous studies by investigating how the attributes of a leader's authenticity affect performance in a Kenyan banking sector which called for replication of studies in other sectors. The Kenyan Banking Sector has in the recent past fallen victim banking crisis especially after the Central Bank of Kenya placed three banks under receivership in 2015/2016 within quick succession, indicating leadership challenges (Osebe & Chepkemoi, 2016). The study was conducted in this Kenyan banking industry context which has faced a myriad of challenges ranging from decline in the quality of the loan portfolio, financial misreporting, fraud, bank collapse while others being placed under receivership which call for new ways of working.

1.2 Research Objectives

The study will be guided by the following specific objectives.

- i. To establish the state of AL practices among the commercial banks in Kenya
- ii. Identify trends in the performance brought about by the deployment of AL
- iii. Determine the effect of the various attributes of AL on the performance of the commercial Banks in Kenya.

1.3 Significance of Study

The study is set to benefit many stakeholders and is timely in the face of the challenging operating environment in the recent past. The commercial banks are beneficiaries since they will be well informed on the attributes of authenticity that can be practiced by the leaders and lead to sustainable performance. The learning and development departments within the banks will also be able to undertake training needs analysis and come up with programs that are suitable for building leadership capabilities. The CBK is also a potential beneficiary as the employment of the attributes of authenticity will lead to stability in banking operations and income in the face of changing macro-economic environment. Consultants in the areas of leadership and organization can also find the study useful in assisting them develop evidence-based leadership development programs that target the banking industry. This information will also assist in capacity building and enhance learning within commercial banks. The study further provides new frontiers of knowledge in the areas of leadership and human resource management practices since human resource orientation that leaders embrace influence whether the leader will have a people orientation (soft approach) or performance orientation (hard approach). It further enhances the practice of authentic

leadership based on situational approaches, especially in changing micro and macroeconomic environments. Finally, the study provides a knowledge repository for the academic fraternity including leadership scholars, researchers, and lecturers. The report can be used as reference material for lectures from a local perspective which is relatable to their current experiences. This may lead to advancement of further research in the areas of authentic leadership and performance.

1.4 Relevant Scholarship

Authenticity is increasingly becoming an emerging social trend and has been referred to as a gold standard of leadership (Grošelj et al., 2020). However, as a concept, it can be traced to the ancient Greeks who based their beliefs on the caution that one should always be true to themselves (Harter, 2002). At the same time, it is described as having sprung up from man's personal conflict within themselves arising from their frustration with the meaninglessness of existence (Chan et al., 2005). Another definition describes authenticity using the injunction from the Ancient Greeks, to 'be true to self' and points out the adage means that one has a true self that exists independent from other persons. This self is shaped by prior developmental interactions with other persons and the environment (Gardner et al., 2005).

Authentic leadership is increasingly gaining popularity in the leadership spheres (Avolio & Gardner, 2005) with it being regarded among the latest scholarly areas in leadership. It centers on the genuineness of the leadership. It is about the leaders' authenticity and their practice and is still in the formative developmental phases (Northouse, 2021). Avolio et al. (2003) posit that authentic leaders are deeply aware of their thoughts and behaviors and the follower's view of them. Their followers perceive them as projecting a consciousness of their personal values as well as their teams, being knowledgeable of their strengths and weaknesses and their effect on their contextual setups.

Individual authenticity comes from social interactions and is to be produced as one is guided by their inner conscience. Authentic leaders are value centered and seek to be consistent in acting out only on the values that they promote. This results in them developing followers into leaders because they gain admiration from consistently acting from their value systems (Fry & Whittington, 2005). Additionally, they know their true selves and live their lives for themselves and their true north points them towards their purpose of leadership resulting in authentic leadership where people want to be associated with them (George & Sims, 2007). Cultivating authenticity is key as the three characteristics of authentic leadership are being open, transparent and trustworthy, directing followers to pursue commendable objectives and placing weight on developing followers (Varella et al., 2005). Additionally, authentic leaders pay special attention to those displaying these characteristics and the conditions where they operate in (Avolio et al., 2005).

Authentic leadership is a foundational leadership component; therefore, nearly all styles of leadership can use it as a basis to define their type of leadership. A leader applying transformational, transactional, directive, or participative styles may still be referred to as being an authentic leader (Avolio & Gardner, 2005; Hughes, 2005; Ilies et al., 2005). Authenticity as a model is grounded in psychology even though as a theory, authentic leadership may be in the inception phases of development. It posits that authenticity leads to heightened self-esteem levels and the authentic actions and behaviors displayed by the leader are consistent with their espoused principles and beliefs (Walumbwa et al., 2008). In today's world where many problems are emanating from leaders' selfish interests in seeking personal profits, there is need for leadership that contributes sustainably and in a long-term manner; thereby, giving rise to AL. The call for AL can therefore be the antidote to a myriad of challenges affecting organizations (Jang, 2022). Overall, then, a leader's authenticity in his leadership largely depends on his capacity to display authentic behavior in all his personal dealings. The authors in this study identified the four attributes of authenticity as self-awareness, internalized moral perspective, balanced processing and relational transparency to establish how they are practiced in commercial banks in Kenya. Each is discussed in the empirical literature review leading to the formulation of research hypotheses.

1.5 Empirical Review and Hypothesis Development

A brief description of the nature of each attribute is discussed and a summary of some previous empirical studies that investigated the application of the constructs in divergent environments and sectors. This study aimed at determining how the attributes of authentic leadership affect performance in the banking industry context. The pragmatic view of authentic leadership submits that it is a means for genuine outcomes leading to performance beyond expectations and actual growth (Gardener et al., 2005; Luthans & Avolio, 2003). Authentic Leadership Development (ALD) is “the process that draws upon a leader’s life course, psychological capital, moral perspective and a ‘highly developed’ supporting organizational climate to produce greater self-awareness and self-regulated positive behaviors, which in turn foster continuous, positive self-development resulting in veritable, sustained performance” (Avolio & Luthans, 2006, p. 178). It is not an overnight process but a journey, as it takes a clear commitment to growth and development as life may easily lure one away from their ‘True North’ which is the inward compass that one needs to steer themselves towards a successful life (George & Sims, 2007). ALD emphasizes authenticity of being true and aware of oneself and to others and is a developmental process that achieves that end goal (Avolio & Luthans, 2006).

Authenticity serves as a leadership multiplier as the authentic leader tends to accomplish more as compared to other leaders (Chan et al., 2005). It is crucial to maintaining long-term results as a leader without it can only achieve short-term success (Grošelj et al., 2020; Jang, 2022;). Kernis (2005) as cited in Hughes (2005) posits that authenticity is operating daily in a way that is unhindered and true to the individual’s core character. That means that to be regarded as authentic, one must accept and be aware of their true self despite the circumstances in their environment (Hughes, 2005). The rising theoretical interest in authentic leadership is expressed by the components that distinguish it from other perspectives of leadership (Avolio & Gardner, 2005). The Kernis model proposes a four-component model of authenticity as; self-awareness, balanced information processing, internalized moral perspective and relational transparency (Gardener et al., 2005; Hughes, 2005; Ilies et al., 2005). Positive psychological capital (Avolio & Luthans, 2006) and positive moral perspective which are areas of divergence also feature as components (Gardner et al., 2005). The study narrowed down the four attributes of authenticity as self-awareness, balanced information processing, internalized moral perspective and relational transparency based on the Kernis model which was used to develop the Authentic Leadership Questionnaire (ALQ) where the research questionnaire was adapted from.

1.5.1 Self-awareness

Self-awareness as a construct of authenticity is the ability to know and trust one’s value systems, motives and personal attributes and being cognizant of how they influence the way they think, feel, act and behave including any inconsistencies in the self-aspects (Ilies et al., 2005). Leaders possessing greater self-awareness are considered as being more genuine (Avolio & Gardner, 2005) and followers are therefore able to trust them as real and not a replica of someone else. They possess the ability to learn from themselves which contributes to followers’ progress (Grošelj et al., 2020). Self-aware individuals have high self-esteem, high self-efficacy, are emotionally stable and possess an internal locus of control (Ilies et al., 2005). In the organization context, self-aware individuals will make better leaders. Authenticity is a continuous state for the leader who attempts to achieve greater self-awareness and it ranges from more to less authentic rather than existing in a dichotomous state in which we are either authentic or not (Hughes, 2005).

Authentic Leadership Development (ALD) involves situations, events and experiences in life that impact how leaders view themselves and how they want to influence their followers (Avolio & Luthans, 2006). It is not an overnight process but a journey, as it takes a clear commitment to growth and development as life may easily lure one away from their ‘True North’ which is the inward compass that one needs to steer themselves towards a successful life (George & Sims, 2007). ALD emphasizes authenticity of being true and aware of oneself and to others and is a developmental process that achieves that end goal (Avolio & Luthans, 2006).

Empirical literature has emerged, due to the increased curiosity in authentic leadership, on how authentic leadership influences performance to back theoretical literature. Walumbwa et al. (2010) revealed a positive

relationship between self-aware authentic leaders and performance, job engagement and citizenship behavior. Sarwar et al. (2023) also carried out a study in the educational sector in China and the findings established that leaders depicting self-awareness positively influences performance directly and indirectly through psychological capital. Authentic leaders lead from the front and are open in the way they make decisions which provides a practical example of how to behave at work and remain emotionally, physically, and cognitively at work; thereby, resulting in higher levels of follower performance (Wang et al., 2014). Self-awareness exhibited the most significant positive relationship in a Kenyan study by Chimakati and Oduol (2023) carried out at the Teachers service commission to investigate the attributes of authentic leadership and ethical sourcing performance. Authentic leaders demonstrate confidence, hope and optimism, qualities worth emulating and the resultant trickle-down effect is the follower's growth which leads to better job performance (Sarwar, 2023). It is upon authentic leaders to cultivate socialized as opposed to personalized charismatic leadership where they use their inspirational power to move organizations and groups to accomplish shared, worthy goals that promote progress of their organizations. The desire to serve the collective good will result in positive manifestation of socialized charismatic leadership, which is highly relevant to authentic leadership, authentic followership, and sustainable, genuine performance (Varella et al., 2005). The study seeks to address the gap in the above empirical studies by isolating the attributes of authenticity, in this case, self-awareness and assessing its effect on performance. Previous studies have measured the combined effect of authentic leadership, and it is not clear how self-awareness contributes to performance when combined with other attributes of AL whose indicators are theoretically linked to performance.

Based on the conceptual and empirical discourses which support a positive relationship between the attributes of self-awareness and performance, the study proposes that in the banking sector deployment of authentic leaders' attributes will have a positive impact on the performance of commercial banks in Kenya. Thus, hypothesis 1 is stated as:

H₁ Leader's self-awareness will have a significant positive effect on performance of commercial banks in Kenya.

1.5.2 Internalized moral perspective

Internalized moral perspective is described as a clear and ethical process of arriving at decisions where authentic leaders build up and pull from reservoirs of abilities to act morally, courageously and in resilient ways to tackle matters based on principles and realize true and sustained ethical deeds (Avolio & Gardner, 2005). Moreover, for a leader to attain authenticity, they must possess a superior moral development level (Walumbwa et al., 2008). The leaders' ability to develop their morality is predicted by the amount and value of moral content held in memory (Hannah et al., 2005). Authentic leaders possess the capability of looking at moral issues through varied lenses and viewpoints; therefore, they can tone down their prejudices and unknown spots that may alter their evaluations. Additionally, they tend to possess an impartial and refined understanding of the details that are involved in complex ethical issues (Avolio & Gardner, 2005).

The pragmatic view of authentic leadership submits that it is a means for genuine outcomes leading to performance beyond expectations and actual growth (Gardener et al., 2005; Luthans & Avolio, 2003). Authentic Leadership Development (ALD) is "the process that draws upon a leader's life course, psychological capital, moral perspective and a 'highly developed' supporting organizational climate to produce greater self-awareness and self-regulated positive behaviors, which in turn foster continuous, positive self-development resulting in veritable, sustained performance" (Avolio & Luthans, 2006, p. 178).

In an empirical study carried out in a military base, Ridderhoff (2013) found that authentic leadership positively influences team performance even in strenuous conditions as the inherent characteristics displayed by the authentic leaders are more pronounced in stressful situations which call for a leader's moral stand. Another study carried out in the best telecommunication companies in Iran to assess the impact of AL on team satisfaction and commitment which are predictors of performance found a positive correlation. It was revealed that teams with leaders who lead with high perspective of morality depicted the other attributes of authenticity; self-awareness, self-regulation, balanced processing and relational transparency had more satisfied and committed employees who were able to perform better at their jobs (Darvish & Rezaei, 2011). Similarly, a study carried out to establish the effect of authentic leadership and motivation on employee performance in Kenyan commercial banks found a

statistically significant effect because leader's lead from an ethical standpoint (Masimane, 2023). The above empirical studies were carried out using either quantitative or qualitative methods therefore the study seeks to introduce a mixed method approach. This way the findings would produce more accurate results in management research and provide a broader perspective on social phenomena, enrich the results, and obtain a comprehensive understanding of the study under examination. Based on the conceptual and empirical discourses which support a positive relationship between the attributes of internalized moral perspective and performance, the study proposes that in the banking sector deployment of authentic leaders' attributes will have a positive impact on the performance of commercial banks in Kenya. Thus, hypothesis 2 is stated as:

H₂ Leader's internalized moral perspective will have a significant positive effect on performance of commercial banks in Kenya.

1.5.3 Balanced Information Processing

Balanced information processing involves the leader's ability to process information relevant to self-including, not being in denial, altering, overstating or overlooking any internal self-knowledge and information from external sources that may be used to assess their leadership. It is at the core of one's personality and integrity which has an impact on the leader's ability to make decision and deeds and have implications for their welfare (Ilies et al., 2005). Authentic behavior depicts people acting in harmony with their self-espoused values, inclinations and desires and not just acting falsely with wrong motives to please others (Ilies et al., 2005). In some instances, it may be possible that when one expresses their true self, they may project a powerful self-image with conduct that may need to be monitored or else end up lacking community approval. Kernis (2005) as cited in Ilies et al. (2005) supports this by postulating that the leaders must act in sensitive ways to balance true self-expression while acknowledging the potential connotations their behavior may have in their surroundings.

Grošelj et al. (2020) conducted a case study in a multinational technology company in Eastern Europe and concluded that there was a positive relationship between AL and innovative behavior specifically when moderated by psychological empowerment. Wang et al. (2014) undertook a study in a Beijing in a Chinese logistics firm to assess the impact of AL and performance and found that follower's psychological capital acts as a moderator on the positive relationship between AL and performance. In another study carried out on Portuguese workers, Ribeiro et al. (2018) concluded that follower emotional commitment mediates the role between AL and performance. The association was further tested in two Jordanian telecommunications firms and the results revealed that working environment, creativeness and work performance are positively influenced AL (Alzghoul, 2018). The results in an analysis carried out in the business sector in Portugal revealed a statistically significant positive relationship between authentic leadership and performance (Duarte et al., 2021). In addition to the identified gap of use of quantitative methods only, the respondents in the empirical studies were drawn from followers thereby this study investigates the views from leaders and followers as the respondents were both from senior and middle management. Based on the conceptual and empirical discourses which support a positive relationship between the attributes of balanced processing and performance, the study proposes that in the banking sector deployment of authentic leaders' attribute of balanced information will have a positive impact on the performance of commercial banks in Kenya. Thus, hypothesis 3 is stated as:

H₃ Leader's balanced information processing will have a significant positive effect on performance of commercial banks in Kenya.

1.5.4 Relational Transparency

Relational transparency is all about placing value and striving to attain follower and associate relationships that are open and truthful resulting in heightened trust levels (Ilies et al., 2005). The leader is obligated to assist followers have a true view of the leader's personality (Hughes 2005). Relational transparency also displays the leader's true being as it is revealed by self-disclosure, comprising of the expression of the four facets of GIVE which are the goals/motives, identity, values, and emotions. These are triggered by significant happenings that the leader may not be aware of. However, the fact that they acknowledge them manifests in their actions and their ability to be transparent in their relationships (Hughes, 2005).

Leadership is a social construct involving followers and, review of literature on authentic leaders reveals that better relationships between leaders and followers yield better results in the organization and vice versa (Gardner et al., 2005; Northouse, 2021; Wang et al., 2014). Datta (2015) equally found that the scope of a leader's effectiveness in varied areas such as the performance of the leader, ability to satisfy the needs of the followers and good progress in the value of work produced is because of their ability to be transparent in relationships with followers. In a study conducted on employees working in different sectors, the findings indicated that due to relational transparency as an attribute of authenticity, the workers' emotional connection is reinforced which results in increasing individual creativity and eventually better performance (Duarte et al., 2021). Lyubovnikova et al. (2017) carried out a survey in the United Kingdom and Greece to establish how AL influences team performance and concluded that the construct of AL collectively shapes team behavior through team reflexivity and positively predicts performance. A Kenyan study by Mbata et al. (2023) to investigate the effect of organizational identification in the relationship between authentic leadership and ethical behavior of employees in commercial banks in Kenya established that organizational identification has partial mediating effect due to strong teamwork built on relational transparency. This agrees with findings from a study to investigate the effect of the relationship between authentic leadership and employee commitment in managers of Kenyan financial management reform agencies which concluded that only relationship transparency had a significant effect when moderated by workplace trust (Gathoni & Muiro, 2023). The study seeks to isolate relational transparency as an antecedent of authentic leadership in order to investigate its effect on performance in the banking sector which is based on trust. This addresses it as a gap by adopting a mixed-method research design due to its creativity in integrating qualitative and quantitative methods to address research questions adequately in terms of weaknesses of one method being offset by the strengths of the other and enhancing the reliability and validity of the findings of the research (Timans et al., 2019). Based on the conceptual and empirical discourses which support a positive relationship between the attributes of relational transparency and performance, the study proposes that in the banking sector deployment of authentic leaders' attributes will have a positive impact on the performance of commercial banks in Kenya. Thus, hypothesis 4 is stated as:

H₄ Leader's relational transparency will have a significant positive effect on performance of commercial banks in Kenya.

2. Method

The study adopted a convergent parallel mixed methods design for the purposes of data collection where the researcher simultaneously collected quantitative and qualitative data and analysis done separately before merging the results (Demir & Pismek, 2018). Descriptive research was used to depict a precise outline of persons, events or circumstances (Saunders et al., 2009) and this aided the researcher to define a distribution of outcomes or computations using few indices. Descriptive data report things as they are in terms of likely conduct, approaches, values and characteristics (Mugenda & Mugenda, 2003). This design was suitable as the data and characteristics of the phenomena under study which were the attributes of authentic leadership and performance were aptly described by the researcher thereby attaining the desired research objectives. The study was a convergent parallel mixed methods survey to be undertaken in the banking sector as data was collected by way of questionnaire and structured interviews once. This was from several banks at one point in time to collect data that can be quantified that is connected to the variables associated with the study (Bryman, 2016). This enabled the researcher to find out the prevalence of the phenomenon by taking a cross-section of the population (Kumar, 2011).

2.1 Research Population & Sampling

The study was carried out in the commercial banks in Kenya. The banking sector in Kenya consists of the Central Bank of Kenya who is the regulator charged with the responsibility of formulating and monitoring policy (Ngure, 2013). It also comprises 38 commercial banks, 1 mortgage finance company and 1 Mortgage refinancing company, 10 representative offices of foreign banks, 14 Microfinance Banks (MFBs), 3 Credit Reference Bureaus (CRBs), 19 Money Remittance Providers (MRPs), 8 non-operating bank holding companies and 72 foreign exchange (forex) bureaus. The study's population comprised all the 39 Kenyan commercial banks as of 31st December 2021 with headquarters in Nairobi County (CBK, 2021). The study applied multistage sampling procedure and the selection of respondents was done using proportionate stratified sampling technique in the different banking peer

group which obtained a sample size of 370 managers: 111 senior managers and 259 middle managers. This was arrived at by calculating the target population of 10,497 senior and middle managers with 95% confidence level and a margin of error of 0.05. For qualitative data, the study purposively sampled 15 Managers (9 Senior Managers and 6 Middle Level Managers) with whom Key Informant Interviews were conducted. The Key Informant Interviews sought to shed light on study variables across the sampled commercial banks

2.2 Participant (Subject) Characteristics

The unit of analysis in the study was the Kenyan commercial banks whereas the unit of observation was the managers at senior and middle management levels. The study chose the banking sector of the Kenyan service sector because, the set of variables being investigated namely the attributes of authenticity and performance are fundamental in the industry which has a central role in the economy of any country. The respondents were included in their study due to their role in explaining the phenomenon under study as the senior managers main role is strategy formulation, monitoring and control and the middle level managers implement strategy on the shop floor to drive performance.

2.3 Research Data and Instrumentation

The main source of data that the study relied on was primary data from the respondents by way of questionnaire for quantitative data and interview guide for qualitative data. Semi-structured interviews within the cross-sectional design were used at an exploratory stage to determine the authentic leadership attributes and performance in the banking sector introducing a mixed method in data collection using the interviews and questionnaires. A structured 5-point Likert scale questionnaire was adapted from the Authentic Leadership Questionnaire (ALQ) to assess Authentic Leadership scales. It was also structured into two sections that enabled the respondents to easily capture the data. The first section gathered data on the respondent's demographics, while the second section focused on data collection in relation to the study variables. The independent variables adopted a scale where respondents indicated the extent to which the leaders in the commercial banks deployed the indicators of the authenticity attributes with the lowest level of 1 being no extent to 5 being a very high extent. The independent variables were operationalized using 15 indicators included in the questionnaire. The dependent variable was operationalized using relevant metrics for performance and 4 indicators used. The respondents were required to indicate the percentage level of performance with the lowest being 1-5% and the highest being 20% and above. Pre-testing of the instrument was carried out to confirm that all the items were stated clearly and can be similarly interpreted by all respondents. The respondents who participated in the pre-testing were not part of the sample (Mugenda & Mugenda, 2014). Reliability of the research instrument yielded a measure of 0.933 was adopted by the researcher as it was above the ideal of 0.7 for a newly constructed instrument (Sekaran, 2003). The study targeted to collect data using a structured questionnaire from 370 Managers (206 from Large Tier Banks, 74 from Medium Tier Banks and 90 from small Tier banks) in all the 39 Licensed Commercial Banks in Kenya with headquarters in Nairobi, Kenya. The respondents for the study were senior and middle level managers and qualitative data was concurrently collected from 15 leaders.

2.3.1 Measures and Covariates

The researcher used questionnaires and Key informant interview schedules to collect both quantitative and qualitative data concurrently. The researcher engaged peers and experts in the research field to ascertain the questionnaire's face and content validity. Additionally, the researcher was also interested in ascertaining whether the instrument taps the concepts as theorized to ascertain the construct validity. This was used to confirm how well obtained results arising from measures used matched the theories from the designed test (Sekaran & Bougie, 2016) and was ascertained by the deduced hypotheses from the theories that relate to the concepts (Bryman, 2016). For the qualitative data, there was an assurance of validity and reliability by focusing on the current themes from the research questions and triangulation of data since both qualitative and quantitative data complement one another (Thomson, 2011). The quality of measurements was enhanced by the training of research assistants.

2.3.2 Research Design

The study adopted a convergent parallel mixed methods design for the purposes of data collection where the researcher simultaneously collected quantitative and qualitative data and analysis done separately before merging the results (Demir & Pismek, 2018). Descriptive research was used to depict a precise outline of persons, events or circumstances (Saunders et al., 2009) and this aided the researcher to define a distribution of outcomes or computations using few indices. Descriptive data report things as they are in terms of likely conduct, approaches, values and characteristics (Mugenda & Mugenda, 2003). This design was suitable as the data and characteristics of the phenomena under study which were the attributes of authentic leadership and performance were aptly described by the researcher thereby attaining the desired research objectives. The study was a convergent parallel mixed methods survey to be undertaken in the banking sector as data was collected by way of questionnaire and structured interviews once. This was from several banks at one point in time to collect data that can be quantified that is connected to the variables associated with the study (Bryman, 2016). This enabled the researcher to find out the prevalence of the phenomenon by taking a cross- section of the population (Kumar, 2011).

3. Results

3.1 Response Rate

The total number of administered questionnaires was 370, where a total number of 352 questionnaires were filled in and returned from the bank managers representing a 95% response rate.

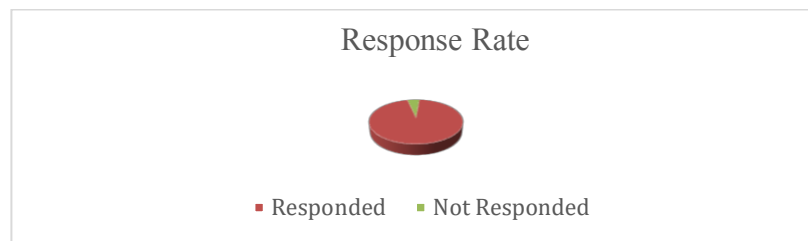


Figure 1: Response Rate

3.1.1 Respondent's Characteristics

The study targeted leaders in executive, senior and middle management drawn from each of the 39 commercial banks operating in Kenya with headquarters in Nairobi County. From the demographic data on the respondents, it is observed that majority of the respondents 81.3% represented Middle Level Managers; hence, were more involved with managing teams at the bank branches and head office, 17.3% were Senior Managers, while 1.4% were executive managers. Regarding the number of years worked in the current commercial bank 45.1% respondents had worked less than 5 years, 27.6% respondents had worked between 6-10 years, while 27.3% respondents had worked in their bank for over 10 years. In terms of gender, 58.5% were male while 41.5% were female.

Table 1: Respondent Demographic Information

Respondent Characteristics	Category	Percentage
Management Position Held in the Bank	Executive	1.4%
	Senior Management	17.3%
	Middle Management	81.3%
Working experience in the banking industry	Less than 5 years	45.1%
	5-10 years	27.6%
	Above 10 years	27.3%
Gender	Male	58.5%

	Female	41.5%
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Source: Survey Data (2024)

3.1.2 Bank Characteristics

The targeted banks were categorized in terms of ownership, tier groups and the years of operation in Kenya and the results are presented in table 2. From the demographic data of the bank, the results showed that 11.9% of the banks were local public commercial banks, 46.9% were local private commercial banks while 41.2% were foreign owned banks. Commercial banks in Kenya are further categorized into peer groups/ tiers depending on their market share. Large tier group banks represent 74.55%, medium tier group banks represent 17.10%, while small tier groups represent 8.22% of the market share CBK (2020). The respondents were also grouped into various tiers and 58% were from Tier 1, 23% from Tier 2 and 19% from Tier 3 banks. 0.6% of the commercial banks had operated in Kenya for less than 1 year, 4.3% between 1-5 years, 3.4% between 6-10 years while 91.7% had operated for more than 10 years.

Table 2: Bank Characteristics

Bank Characteristics	Category	Percentage
Ownership	Local Public Commercial Bank	11.9%
	Local Private Commercial Bank	46.9%
	Foreign Commercial Bank	41.2%
Tier Group	Tier 1	58%
	Tier 2	23%
	Tier 3	19%
Years of operation in Kenya	Less than 1 year	0.6%
	1-5 years	4.3%
	6-10 years	3.4%
	>10 years	91.7%

Source: Survey Data (2024)

3.2 Characteristics of Study Variables

The behavior of the study variables among the commercial banks was summarized using descriptive statistics of the mean and the standard deviation. The primary data obtained using a 5-point likert scale was used to compute the mean and standard deviation for each of the study variables and Pearson correlation coefficient calculated to show how the variables correlate among themselves and with the dependent variable. The descriptive statistics indicate that the attributes of authentic leadership were embraced and practiced by the respondents in the commercial banks to varying levels of extent. The level of performance reported by the banks was rated by the respondents at the level of growth between 10-15%. Balanced processing and internalized moral perspective as attributes of authenticity were practiced to a relatively high extent while relational transparency and self-awareness were deployed to a moderate extent. The correlation coefficients indicate that the variables had significant correlations with the dependent variable.

Table 3: Variable Characteristics and Correlations

Variable	Mean	Std Dev	Correlations				
			1	2	3	4	5
Performance	3.21	1.36	1.000				
Self-awareness	3.64	0.97	0.157**	1.000			

Internalized moral perspective	3.87	0.84	0.171**	0.543**	1.000		
Balanced processing	3.94	0.87	0.346**	0.542**	0.543**	1.000	
Relational transparency	3.69	0.92	0.260**	0.482**	0.510**	0.542**	1.000

**p<0.05

Source: Survey Data (2024)

3.2.1 Financial Performance of Commercial Banks

The study sought to establish the financial performance of the banks in terms of profitability, portfolio quality, financial management and efficiency and productivity.

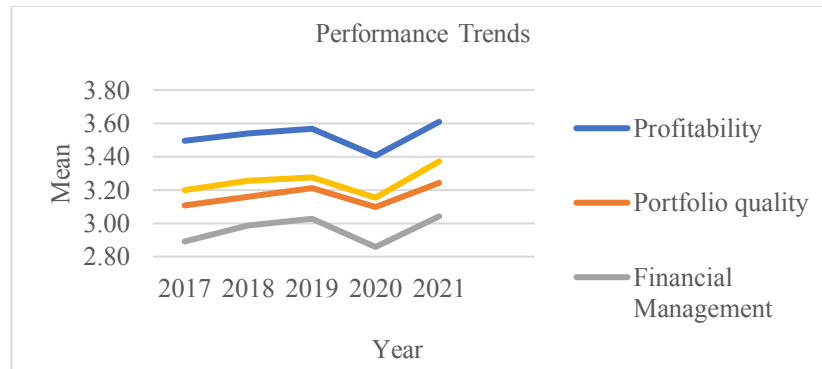


Figure 2: Trends for Descriptive statistics for performance

Source: Survey Data (2024)

From Figure 2 the profitability, portfolio quality, financial management and efficiency and productivity of the banks over the five-year (2017 – 2021) period was that the indicators had grown and improved steadily between 2017 – 2019. However, they appreciated the fact that during COVID-19 pandemic in 2020/2021 the indicators dipped but were once again on an upward trajectory after the reopening of the economy. From the aggregate results it is observed that the average level of performance stood at the range of 10-15% annually. This may be attributed to the steady growth in the commercial banks leading to stiff competition as noted by Choudhary (2013), Mulonzi (2017), Ngumi (2013) and Ojokuku (2013). It was further noted that the performance varied across the commercial banks with a high standard deviation of 1.36. The findings were also consistent with Muigai & Gitau (2018) who noted unsteady trends in the performance of commercial banks in Kenya.

3.3 Test for Hypotheses

The study tested four hypotheses using each of the independent variables against the dependent variable. The multiple regression output is shown in Table 4. The regression results indicate a weak relationship between the performance of the commercial banks and the four attributes of authenticity ($Adj. R^2=0.120$). The regression model fit is good with $F=12.995$; $P=0.000$.

Table 4: Results for Hypothesis Testing

Parameter	Value	P-value	Observation
R	0.361		Effect of authentic leadership weak on performance
R ²	0.130		13% variation on performance explained
Adjusted R ²	0.120		
F	12.995	0.000	Model good fit
SSE	42.136		
MSE	10.543		
β Constant	1.362	0.000	

β Self-awareness	-0.181	0.335	H ₁ not supported
β Internalized moral perspective	-0.520	0.606	H ₂ not supported
β Balanced processing	0.444	0.000	H ₃ supported
β Relational transparency	0.166	0.047	H ₄ supported

Source: Survey Data (2024)

3.3.1 Hypothesis 1

The first hypothesis of the study determined the effect of a leader's self-awareness on performance of commercial banks. The regression results presented in Table 4 show that there is a nonsignificant negative statistical effect of self-awareness on performance ($\beta = -0.181$, $p = 0.335 > 0.05$). This implies that with all factors held constant, a unit change in authentic leadership will lead to a movement in the opposite direction in performance by 0.181. It is observed that the p-value was more than 0.05 significance level. The study therefore did not support the hypothesis and concluded that self-awareness is not a significant determinant of the performance of commercial banks in Kenya.

Self-awareness as an attribute of authentic leadership revolved around three themes: the leaders seeking followers' opinions before making up their own, which also meant involving followers and coming up with workable solutions to problems while the leader also being aware of their greatest strengths and weaknesses. This was aptly expressed by informant Ms. R in an emerging theme of team building which had an external outlook on the leader's awareness as opposed to internal outlook which reflects self-awareness as an attribute of AL:

"No one is perfect. Even those who have been trained, even people with PhD, professors, encounter problems, they make mistakes daily. How do we approach problems? We do it in different ways or use different methods. For example, sometimes we do team building. Team building in the sense that we make sure people are working together, internal consultation and borrowing from one another's knowledge and ideas and experiences. Good communication is also key to solving problems. If there is a problem in the organization and you don't communicate, people assume that everything is okay. But if you communicate, you raise the alarm and the chances of repeating the same mistake are eliminated, but if you don't communicate, the same mistake will occur again and again." (Ms. R – Manager KII)

The findings supporting hypothesis 1 are not consistent with previous empirical studies despite being practiced in the commercial banks to a moderate extent (Chimakati & Oduol, 2023; Sarwar et al., 2023; Varella et al., 2005; Wang et al., 2014). The mentioned studies measured the combined effect of authentic leadership, and it was not clear how self-awareness contributes to performance when combined with other attributes of AL whose indicators are theoretically linked to performance.

3.3.2 Hypothesis 2

The second hypothesis of the study determined the effect of a leader's internalized moral perspective on performance of commercial banks. The regression results presented in Table 4 show that there is a nonsignificant negative statistical effect of internalized moral perspective on performance ($\beta = -0.520$, $p = 0.606 > 0.05$). This implies that with all factors held constant, a unit change in internalized moral perspective will lead to a movement in the opposite direction in performance by 0.520. It is observed that the p-value was more than 0.05 significance level. The study therefore did not support the hypothesis and concluded that internalized moral perspective is not a significant determinant of the performance of commercial banks in Kenya. The authentic leadership construct of internalized moral perspective calls for leaders who are guided by their morals, act in ways that reflect their core values while not allowing group pressures control them. For an individual to survive and grow in the banking industry, the key attributes required are trust, integrity, and values whereby the authentic leader sets the stage and breeds authentic followers guided by the principles of reliability and trust which in turn is welcomed among customers. The result is that it yields high performance as there is increased business resulting from an improved

customer satisfaction index. From the bank characteristics in the demographic data, 46.9% of the respondents worked for local private commercial banks of which the composition of the board of directors and ownership is family-owned. The accountability and transparency structures are therefore subject to the values set by the board. The qualitative data was supportive of this position in that one of the major themes that emerged from the in-depth interviews was that touching on organization culture which was family oriented. The dimensions of the culture they seemed to identify are those that are related to the consistency and flexibility in connection with the vision of the banks and its role in steering the bank into their desired future. The interviewees observed that there has been a lot of effort put by management in ensuring that all the employees are fully aware of the vision of the banks, such that management has an easy task of explaining to the employees about the long-term direction of the banks. Towards this, four informants observed that:

“The organizational leadership is visionary... The leaders openly make the vision clear to everyone working in the bank to ensure there’s a common work culture.” (Ms. N – Manager KII)

“My leader clearly articulates the vision and what is expected of each party to be able to meet the overall vision of the company... His style of leadership lies in ensuring that the team works as one to achieve the overall mission and vision of the company as they assist one another.” (Mr. R – Manager KII)

“Our leadership approach is very professional, and it has always allowed for the performance to improve...If you compare our previous performance before we adopted the new leadership style, you will notice that performance has really improved.” (Mr. J – Manager KII)

“In terms of performance, I will say there has been efficiency in serving our customers. The profit margin has also grown. I attribute all this to good governance and the leadership...” (Ms. B – Manager KII)

The findings supporting hypothesis 2 are not consistent with previous empirical studies despite it being deployed to a high extent in the commercial banks (Darvish & Rezaei, 2011; Masimane, 2023; Ridderhoff, 2013). The gap that the study sought to address was to isolate and conceptualize internalized moral perspective as an attribute of authenticity and assessing its effect on performance.

3.3.3 Hypothesis 3

The third hypothesis of the study determined the effect of a leader’s balanced processing on performance of commercial banks. The regression results presented in Table 4 show that there is a significant positive statistical effect of balanced processing on performance ($\beta = 0.444, p = 0.000 < 0.05$). This implies that with all factors held constant, a unit change in balanced processing will lead to a movement in performance by 0.166. It is observed that the p-value was less than 0.05 significance level. The study therefore supported the hypothesis and concluded that balanced processing is a significant determinant of the performance of commercial banks in Kenya. This also appeared as an emerging theme of problem solving in the qualitative data. Balanced processing allowed the leaders to collaboratively think through and consult with others to come up with a solution to the problems, listening closely to the ideas of those who disagree with them and seeking the follower’s opinions before making up his/her mind which underscored the role of effective communication in solving organizational problems and challenges. Informants Mr. L, K, R and X had this to say:

“Well, so when it comes to problem solving as a manager, I make sure that I include the staff and we discuss and come up with the solutions to the problems. However, if it’s a minor issue, then I may implement the solution myself and then guide the employees through the solution process.” (Mr. L – Manager KII).

“It’s an open-door policy. Managers seek the staff’s opinion and also the staff feel free because they are included in decision making. However, this varies from branch to branch. But generally, managers listen to their staff.” (Mr. K – Manager KII)

“No one is perfect. Even those who have been trained, even people with PHD, professors, encounter problems, they make mistakes daily. How do we approach problems? We do it in different ways or use different methods...” (Ms. R – Manager KII)

“First, I would define the problem by talking about it to my fellow colleagues or by observation, look more closely to the issue and find any relative information, analyse the problem with the team so that I can get multiple opinions then create a solution using the information I have gathered about the problem.” (Ms. X – Manager KII)

The descriptive statistics reported that the sampled leaders practiced the attribute of balanced processing to a high extent and thereby its effect on performance is positive and significant. The finding supporting hypothesis is consistent with previous research by Alzghoul (2018), Ribeiro et al. (2018), Grošelj et al. (2020), Wang et al. (2014) and Duarte et al., 2021 who found a positive relationship between balanced processing and performance that included problem solving, consultation and communication.

3.3.4 Hypothesis 4

The fourth hypothesis of the study determined the effect of a leader’s relational transparency on performance of commercial banks. The regression results presented in Table 4 show that there is a significant positive statistical effect of relational transparency on performance ($\beta = 0.166$, $p = 0.047 < 0.05$). This implies that with all factors held constant, a unit change in relational transparency will lead to a movement in performance by 0.166. It is observed that the p-value was less than 0.05 significance level. The study therefore supported the hypothesis and concluded that relational transparency is a significant determinant of the performance of commercial banks in Kenya. Relational transparency as an attribute was only moderately practiced by the managers with only one emerging theme of the leaders openly sharing their feelings with others. The qualitative data from the key informants expressed that their banks supported an adaptive and collaborative organizational culture which was an emerging theme that allowed for free and seamless interaction between and among staff. Further, some also felt that their institutions exhibited relationship-oriented culture where the staff treated and viewed each other as family. Some leaders also reported that to ensure that all staff freely interact, some informal gatherings at the workplace were also incorporated as part of their routine such as sharing a meal and drinks at the end of the week, while others are at liberty to conduct prayer sessions together. The managers felt that in addition to moral and spiritual nourishment, such activities also helped to strengthen the bonds and the relationships among the staff. This in turn helped the staff to be free with one another as they share issues that they may feel are not working out well in the organization. This was also a good opportunity that the managers also took to interact even with the lowest cadre employees such as the junior officers and support staff. This inadvertently reduced the gap and the fear that may exist among the subordinates as expressed by three informants.

“We always try to minimize the gaps. We make sure the relationship is good. Every morning, we make sure we assemble and pray together and sing together. That is, apart from worshipping God you also mend relationships, we make the relationships strong. The relationship must be there. Let’s say teamwork is very sovereign. During these meetings we share ideas every week as we interact with everybody, even the people are giving us services like the cleaners. They may have noticed one or two things that you did not notice. And they share their observations during such interactions.” (Ms. P – Manager KII)

“Initially there were some complex structures in the banking system where the people sitting in the managerial positions were never available. However, in my organization I have made sure that we from the Executive Management are able to interact with one another and even with our staff in the lowest job cadres... This has helped us a lot and has improved our performance as a bank.” (Mr. H – Manager KII)

“When you are open with your staff, they understand what they are doing. You see, if you keep the vision to yourself and you just come up with a plan, they will not know why this plan is in place. They may not know why they should implement certain things. So, it is important to involve and inform them at the initial stages. Ensure you get everybody involved. Get everybody at the table when you are coming up with a plan. Then you share out that plan once everyone has understood it.” (Mr. T – Manager KII)

The descriptive statistics reported that the dimensions of relational transparency measured were embraced by the sampled leaders to a moderate extent. The relative contribution of this level leading to the support of the hypothesis is consistent with those of previous research (Duarte et al., 2021; Gathoni & Muiru, 2023; Lyubovnikova et al., 2017; Mbata et al., 2023) who reported a positive relationship between relational transparency and performance

4. Discussion

The study explained the results arrived at using descriptive statistics of the variable, qualitative research findings, previous research, the theoretical anchorage and the characteristics of the context of the investigation. It was designed and conducted to address three objectives. The first objective was to establish the state of AL practice among the commercial banks. From the descriptive statistics, it was noted that the four attributes of leader's authenticity (self-awareness, internalized moral perspective, balanced processing and relational transparency) have been deployed. The attributes of balanced processing and internalized moral perspective have been deployed to a high extent while relational transparency and self-awareness have been deployed to a moderate extent. The descriptive data noted that there was gender equity at management levels at almost 50-50 levels. When this was analysed from the gender lens, it indicated the presence of attributes of AL that support consultative leadership in their application and hence, where females are well represented, their influence on the leadership style adopted by the organization applied is felt. Authentic leadership was practiced to a high extent with the dimensions of balanced processing where the leaders listened closely to the ideas of those others before making a decision including those who disagree with them. The qualitative interview results supported the study findings by yielding an overarching theme of a relationship oriented or interactive organizational culture. The sub-theme of informal gatherings building and supporting interactive organization culture and free flow of ideas also supported the findings leading to higher levels of performance. The study findings were consistent with empirical literature that supported the propositions since authentic leaders are relational and lead by example which in turn motivates followers to perform at higher levels.

The second objective was to identify the level of performance brought about by the deployment of AL. In this study, performance was operationalized through profitability, portfolio quality, financial management and efficiency and productivity. This study required the respondents to indicate the level of performance in the bank over the last five years from 2017 to 2021. An average for each of the five years was computed and the results are shown in Figure 2. The key informant interview on respondent's assessment of the profitability of the banks over the five-year (2017 – 2021) period was that it had grown and improved steadily between 2017 – 2019. However, they appreciated the fact that during COVID-19 Pandemic in 2020/2021 the profits dipped but were once again on an upward trajectory after the reopening of the economy. The demographic data on the banks regarding the duration that the banks had operated in Kenya revealed that they had been in existence for a period of more than 10 years (92%). Within the 10 years the macro-economic environment had been characterized by turbulent seasons such as closure of banks, election cycles and the COVID-19 Pandemic. Moreover, within these 10 years, the managers were still required to perform to meet the investors' expectations; hence, we find a justification for the exercise of AL in influencing performance positively. Additionally, most of the respondents indicated that they had worked in the commercial banks for between one and five years which implies that they understood the importance of genuine and trustworthy leadership in driving strategy and performance, especially in the dynamic operating environment banks find themselves in.

The third objective was to determine the effect of the various attributes of AL and the performance of the commercial banks. This explains why the respondents highly practiced relational transparency as it has a positive effect on performance and was supported by the qualitative data; whereby, some of interviewed leaders were also able to appreciate changes that have taken place as far as leadership and management in the banking sector is

concerned. They noted that in the past, there was a lot of bureaucracy and complexity in leadership and management in the banking sector. They reported, that in the past it was almost impossible to get an opportunity to interact with the executive and senior management personnel in the banks. However, as leadership has evolved this is no longer the case and even the junior staff as well the customers can get an audience with the managers with ease. This has created a cordial and harmonious relationship between and among the managers on the one hand and the customers and the junior staff on the other. Secondly, the demographic data on the attributes of the respondents indicated that they mostly comprised middle level managers (81%) who were either in the categories of branch managers, relationship managers and operations managers. The mandate of these managers by virtue of their job description is that of driving competitiveness of respective business units or functional areas; thus, it would be expected they spend most of their time with their followers driving and implementing strategy to achieve business performance. This would mean that problem solving was an inevitable part of their day-to-day operations as the respondents agreed that the leadership practice involved balanced processing.

Lastly, the findings on the hypotheses were explained in comparison with previous research which measured the combined effect of authentic leadership, and it was not clear how self-awareness; internalized moral perspective, balanced processing and relational transparency contribute to performance when isolated from other attributes of AL whose indicators are theoretically linked to performance (Alzghoul, 2018; Darvish & Rezaei, 2011; Duarte et al., 2021; Grošelj et al., 2020; Gathoni & Muir, 2023; Lyubovnikova et al., 201; Masimane, 2023; Mbata et al., 2023; Ribeiro et al., 2018; Ridderhoff, 2013). The findings contribute to the body of knowledge in commercial banks through revealing the evolutionary nature of authentic leadership due to contextual experiences. Therefore, the context it is applied in determines its suitability especially in cases where the operating environment is dynamic and riddled with adverse conditions. It is coming out strongly from the findings that, AL embraces the attributes of collaborative leadership as it is critical for the leaders to involve followers in the practice of AL to drive performance.

5. Implications and Conclusions

Based on the study's findings, the researcher noted that the findings raise implications touching on the evolutionary nature of authentic leadership due to contextual experiences and therefore the context it is applied in determines its suitability especially in cases where the operating environment is dynamic and riddled with adverse conditions which the sector has experienced in the recent years. Secondly, the findings bring out a strong implication that AL embraces the attributes of collaborative and consultative leadership as it is critical for the leaders to involve followers in the practice of AL to drive performance. These findings can therefore be generalized in other sectors even though the extent of the impact depends on the sector where authentic leadership is practiced. Thirdly it is implied the application of the attributes of AL thrives within a relationship-oriented culture that has flatter organizational structures which guarantees better response in problem-solving especially in the context of a dynamic operating environment.

The study made the following conclusions. First, the study concluded that leaders of commercial banks in Kenya practice the various attributes of authenticity. The attributes of balanced processing were expressed by listening very carefully to the ideas of others before making decisions and listening closely to the ideas of those who disagree with them. Internalized moral perspective expressed by the leader's morals guide what the leader does and actions reflect his/her core values have been deployed to a high extent. relational transparency was expressed by leaders openly sharing feelings with others and letting others know who they truly are as a person. Self-awareness was present as leaders seek the opinions of others before making decisions and the leader's ability to list their top three strengths have been deployed to a moderate extent.

Secondly, the study concluded that there was an increased level of performance due to the deployment of authentic leadership attributes of balanced processing since they were essential for problem solving, consultation and communication. Relational transparency also leads to better performance since there was an adaptive and collaborative organizational culture which was an emerging theme that allowed for free and seamless interaction between and among staff. Further, the banking institutions exhibited relationship-oriented culture where the staff treated and viewed each other as family. However, there was a decrease in the level of performance where

internalized moral perspectives was deployed due to the accountability and transparency structures that were subject to the values set by the composition of the board of directors and ownership which are family-owned. This was also the case with self-awareness where from the constructs, there was external outlook on the leader's awareness as opposed to internal outlook.

Suggested areas of further research arise from the fact that the findings were limited to commercial banks in Kenya with headquarters in Nairobi County and may not be generalized to other regulated financial institutions in the financial sector. The study thus suggests that other studies be conducted on other financial players such as microfinance banks, insurance companies and Savings and Credit Cooperative Societies (SAACOs). Secondly, the study was cross sectional in nature and findings were based on data collected in a survey relating to period of five years between 2017- 2022 and therefore, may not be used to make long term inferences about the effect of leadership styles on performance of commercial banks since, sustainability of the banking industry is imperative. During this period, there were adverse macro-economic conditions such as the capping of interest rates, mergers, acquisition and closure of banks, COVID-19 Pandemic and conducting of hotly contested general elections in 2017 and 2022 in Kenya. These are factors which could have affected the operations and performance of the commercial banks. The study, therefore, suggests that a longitudinal study be carried out covering longer periods beyond five years to determine the long-term effect of leadership style and political interference or mergers and acquisition of commercial banks on their performance.

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Informed Consent Statement/Ethics approval: Ethical issues in research are concerned with confidentiality and privacy, anonymity, voluntary and informed consent of respondents, no physical and psychological harm to respondents including not using vulnerable and/ or special populations as research subjects. The researcher worked with only voluntary participation to purge or manage any ethical issues which can lead to introduction of response bias (Bryman, 2016). In addition, the researcher obtained permission to undertake the research from National Commission for Science Technology and Innovation (NACOSTI) and following the guidelines laid down by Pan African Christian University. The researcher was watchful in ensuring that respondents were voluntarily involved in the study, while utilizing minimal time and resources to obtain data that is required. An informed consent form for signing was also shared with the participants to explain the essence of the study and details of their participation. A quantitative research method approach adopted ensured that the researcher was objective, reliable and independent. Clarification on the study's objectives to the respondents was first carried out and they were assured that the availed data was utilized for educational purposes only.

Data Availability Statement: Data supporting reported results can be availed at request from main author.

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Bitcoin Adoption Strategy as a Company Asset in Indonesia

Iman Patria Yudha¹, Raden Aswin Rahadi², Ana Noveria³

¹ School of Business and Management, Institut Teknologi Bandung. Email: iman_yudha@sbm.itb.ac.id

² School of Business and Management, Institut Teknologi Bandung. Email: aswin.rahadi@sbm-itb.ac.id

³ School of Business and Management, Institut Teknologi Bandung. Email: ana.noveria@sbm-itb.ac.id

Abstract

This research investigates the strategic adoption of Bitcoin as a corporate asset in Indonesia, focusing on its potential as an inflation hedge and its impact on enhancing shareholder value. Employing a mixed-method approach combining qualitative interviews and the Analytical Hierarchy Process (AHP), the study explores the challenges, risks, and opportunities associated with integrating Bitcoin into corporate financial strategies. The findings reveal that risk mitigation emerges as the primary priority for companies considering Bitcoin adoption, underscoring the need for robust strategies such as investment diversification, hedging, and scenario analysis. Stakeholder acceptance, encompassing investors, regulators, and market sentiment, is identified as the second most crucial factor, highlighting the importance of a supportive regulatory environment and investor confidence. The research also highlights the significance of analyzing price trends and optimizing asset allocation strategies. The AHP analysis identifies the Strategic Diversification approach as the most preferred alternative, aligning with Modern Portfolio Theory principles. Additionally, the study addresses accounting and financial reporting challenges associated with Bitcoin adoption, emphasizing the need for clear guidance and standards. The implementation plan outlines key aspects such as infrastructure development, education initiatives, risk management frameworks, and regulatory collaboration to facilitate the responsible integration of Bitcoin into Indonesian corporate finance strategies.

Keywords: Bitcoin, Corporate Asset, Inflation Hedge, Shareholder Value, Risk Mitigation, Stakeholder Acceptance

1. Introduction

Globally, inflation poses a serious threat to businesses as it reduces money's purchasing power and raises the cost of capital due to increased interest rates, which affects both debt and equity (Cochrane, 2022; Eren & Malamud, 2022). Businesses like MicroStrategy, who have to manage these economic conditions to sustain growth and profitability, are especially affected by this difficulty. Due to its decentralized structure and limited quantity, Bitcoin has recently gained attention from businesses looking to diversify their investment portfolios and protect money (Nakamoto, 2009). Furthermore, as demonstrated by the addition of Bitcoin to the treasury reserves of Tesla and MicroStrategy, the acceptance of Bitcoin has an impact on corporate financial strategy. The long-term value of Bitcoin influences this strategic choice, which may have an impact on financial risk management, shareholder value, and the cost of capital (Dahlquist & Pénasse, 2022).

The laws governing Bitcoin and other cryptocurrencies are changing in Indonesia. Bappebti Regulation 13/2022, which describes the rules for cryptocurrency trading and related activities, governs Bitcoin, which is acknowledged as a commodity but not as legal tender (Bappebti, 2022). Businesses that want to trade cryptocurrencies have to

get certain licenses and adhere to strict AML regulations (BAPPEBTI, 2019). With a strong increase in its cryptocurrency market, Indonesia has adopted digital payment trends to the extent that it ranks 20th internationally in the Cryptocurrency Adoption Index for 2022. The establishment of a cryptocurrency exchange with state backing intends to improve investor protection and transparency, demonstrating the government's commitment to regulating this rapidly expanding industry. The nation's cryptocurrency market experienced a significant rise in transaction value and is predicted to gain over \$1 billion by 2023, proving its durability even during a down market. For companies in Indonesia, integrating cryptocurrency has several advantages, such as lower operating costs, more access to new markets, and more financial inclusion. Platforms like CEX.IO, which offer a safe entry point for purchasing, selling, and trading cryptocurrencies, encourage this adoption and help Indonesia's cryptocurrency ecosystem flourish. By entering new markets and enhancing payment systems, firms can utilize bitcoin strategically to cut out middlemen, decrease corruption through increased transparency, and promote economic progress. With the establishment of a national cryptocurrency asset exchange and other proactive regulatory measures, the government has established Indonesia as a major player in the global cryptocurrency market, spurring innovation and providing lucrative investment opportunities.

Cloud-based services, mobile software, and business analytics are the areas of expertise for MicroStrategy (MSTR), a Tysons Corner, Virginia-based global leader in corporate software solutions. The business was founded in 1989 and provides the MicroStrategy Analytics platform, which is well-known for its scalability, flexibility, and capacity to manage massive data volumes. Its clientele includes a wide range of sectors, such as retail, banking, healthcare, and telecommunications. MicroStrategy made the strategic decision to embrace Bitcoin as its principal treasury reserve asset in August 2020. CEO Michael Saylor highlighted the cryptocurrency's potential as a hedge against inflation and a store of value because of its limited quantity. This choice not only set MicroStrategy apart from its competitors but also demonstrated its innovative position at the nexus of technology and finance, allowing it to successfully navigate the rapidly changing domains of blockchain technology and digital assets. The company has demonstrated its innovative approach to capital management by strategically using convertible note issuances to fund its initiatives, including Bitcoin acquisitions. This aligns with the company's long-term vision and positions it as a leader in the incorporation of digital assets into corporate finance strategies.

In the turbulent world of blockchain and cryptocurrencies, convertible bonds are a valuable financial tool that allow businesses to acquire capital with minimal stock dilution and appeal to a wide range of investors thanks to bond coupons and conversion opportunities. These bonds are especially helpful in sectors like blockchain, where businesses need a lot of capital to grow and innovate. In Indonesia, for example, legal frameworks from organizations like Bappebti, which has set up a national cryptocurrency exchange and futures clearing house, support the integration of cryptocurrencies as acceptable corporate assets. The incorporation of digital assets into corporate plans has been accelerated by the government's encouragement and regulatory support of 229 cryptocurrencies. One example of this is the partnership between Binance and Telkom Indonesia's venture capital arm to launch a new digital asset exchange.

In this encouraging environment, the research goals center on investigating how Indonesian business executives view and feel about integrating Bitcoin into their corporate strategies, outlining risk management techniques for doing so safely, and evaluating how the price volatility of Bitcoin affects the financial stability and market perception of businesses that are thinking about adopting cryptocurrencies. The purpose of these studies is to determine how prepared Indonesian executives and financial specialists are for the use of cryptocurrencies in corporate operations, as well as what worries them.

2. Literature Review

2.1. Cryptocurrency

The cryptocurrency market runs on a decentralized network based on blockchain technology, providing strong security and resistance to counterfeiting. Bitcoin leads the way, with assistance from other cryptocurrencies like Ethereum, Ripple, and Litecoin (Manjula et al., 2022). With its peer-to-peer, safe, and transparent transactions that are independent of central financial authorities, Bitcoin—which was first introduced in 2008 under the pseudonym

Satoshi Nakamoto—has played a significant role in upending established financial institutions (Lee et al., 2018). Referred to as "digital gold" because of its limited supply of 21 million coins, Bitcoin is a desirable long-term investment that provides stability and an inflation hedge, much like precious metals (Rauchs, 2018) The global regulatory discrepancy is reflected in the fact that some nations have banned cryptocurrencies, while others have welcomed them as valid means of exchange (Rajesh et al., 2022). The cryptocurrency market is growing despite obstacles like security, privacy, and regulatory uncertainty. This growth is being driven by the technology's ability to lower transaction costs and speed up transactions, making it a competitive alternative to traditional fiat currency systems (Li & Whinston, 2020).

Because they provide a more solid option to more established cryptocurrencies, stablecoins—digital currencies linked to reliable assets like fiat currencies—play a crucial role in the cryptocurrency market. According to a study conducted by Ante et al., (2021) that examined 1,587 stablecoin transfers between April 2019 and March 2020, these transfers had a significant impact on Bitcoin's trading volumes and returns. The effects of the transfers varied depending on the sender-recipient dynamics, suggesting that different transfer motives and information asymmetries were perceived by the market. Moreover, a study conducted on 565 stablecoin issuance events during the same time frame revealed that although market downturns usually precede issuances, there are notable positive abnormal returns shortly after, which promote price discovery and improve market efficiency (Ante et al., 2021). Four primary stabilization techniques are used to classify stablecoins, which can be issued by central banks or private organizations. This highlights the crucial role stablecoins play in promoting a reliable and effective trading environment amongst the volatility of the cryptocurrency market (Fantacci & Gobbi, 2021).

2.2. Modern Portfolio Theory (MPT)

Harry Markowitz developed Modern Portfolio Theory (MPT) in the 1950s and suggests diversifying investment portfolios to maximize the ratio of risk to return. By using Mean-Variance (MV) research, MPT highlights market interactions and holistic assessment by encouraging investors to see assets as a component of an overall portfolio. According to Messica, (2018), investor behavior should transition towards a more complete approach to asset management by giving priority to risk concerns above prospective returns when making investment decisions. MPT is particularly relevant in the developing world of cryptocurrencies, offering methods for incorporating virtual assets such as Bitcoin into portfolios to minimize risk and optimize returns. This approach, which emphasizes the crucial role that risk management and diversification play in maintaining long-term investment goals, is still essential for investors navigating the intricate and dynamic world of digital finance (Chen, 2024). The potential importance of Bitcoin in augmenting diversification and maximizing risk-adjusted returns on corporate balance sheets is underscored by its relevance in the context of MPT. Portfolio diversification techniques can be greatly impacted by the features of Bitcoin, such as its low correlation with traditional asset classes and its potential as an inflation hedge. Because of its extreme volatility and unpredictability in the regulatory landscape, integrating Bitcoin into investing strategies based on MPT principles might be challenging, but it also presents a special chance to improve portfolio efficiency. Because of its low correlation with traditional financial assets, empirical research suggests that adding Bitcoin to diverse portfolios could enhance expected returns and efficiently manage risk (Kajtazi & Moro, 2019). But as Guesmi et al., (2019) point out, adding such erratic assets necessitates thorough risk assessment and a calculated approach to preserve portfolio balance.

2.3. Convertible Bonds

For businesses like MicroStrategy, convertible bonds are a strategic financial tool that combine elements of debt and equity to improve capital structure and lower capital expenses. Due to the attractive conversion feature, issuers are able to offer lower interest rates than those on standard bonds. These bonds have the dual benefits of fixed-income earnings and the potential for equity gains if the stock value rises Finnerty, (2015). Hedge funds, which are adept at managing the risks associated with the dual nature of convertible bonds in the face of credit, interest rate, and stock market fluctuations, are drawn to the bonds' intricate terms, such as conversion ratios and maturity dates (Batten et al., 2018). Convertible bonds also match bondholders' interests with equity investors', which makes them a desirable choice for businesses going through major capital expenditures or strategic transitions like mergers and acquisitions (Dutordoir et al., 2014).

2.4. Cost of Capital

In corporate finance, the Weighted Average Cost of Capital (WACC) is a critical metric that combines the costs of debt and equity financing to calculate an organization's total financing costs. WACC represents the required return rate from all capital sources and is used as a standard for assessing investment prospects. This helps to inform decisions about new initiatives (Cacciafesta, 2015). WACC is a discount rate that is used in capital budgeting to determine the present value of future cash flows (Johnston et al., 2018). Its application in multivariate regressions to assess potential returns highlights its analytical power in market dynamics (Sultana et al., 2019). Conversely, the cost of debt has a direct impact on borrowing costs, which in turn affects a company's capital structure and the proportion of debt to equity (Choi & Lee, 2015; Lemmon & Zender, 2019). Due to its comparatively lower cost, companies may favor debt; nonetheless, a significant dependence might raise the risk of financial distress. Determining loan costs and maximizing capital structure are crucial processes that depend on variables such as interest rates and creditworthiness. The perceived risk of purchasing a company's stock, which is impacted by a number of variables like market volatility and company-specific hazards, is what drives investors' expectations of return, which is reflected in the cost of equity (Cao et al., 2015; Mokhova et al., 2018).

2.5. Company Valuation

In the field of corporate finance, sound company valuation techniques are essential for figuring out a company's intrinsic value, which guides important investment choices and long-term financial planning. Financial experts employ a multidimensional strategy that combines methods like Discounted Cash Flow (DCF) Analysis, which takes growth projections and the time value of money into account while discounting expected future cash flows to present value. Furthermore, Market Multiples Valuation evaluates a company's worth by contrasting it with other companies in the same industry using important financial criteria such as the price-to-earnings (P/E) ratio. The industry, development stage, data accessibility, and valuation goal are some of the variables that influence the choice of valuation techniques. In addition to these techniques, financial ratio analysis provides information about the performance and health of a business, including ratios related to profitability, liquidity, solvency, and efficiency.

2.6. Bitcoin Market Analysis and Valuation Techniques

Because of its finite quantity and decentralized character, Bitcoin poses special valuation issues that call for different analytical frameworks. PlanB's Stock-to-Flow (S2F) Model, which forecasts price increases as supply tightens, highlights Bitcoin's scarcity as a value driver. However, it has drawn criticism for oversimplifying market dynamics. Although it lacks forecasting precision, the Power Law Model is able to discern patterns in the very erratic price movements of Bitcoin, pointing to a distribution with frequent small fluctuations and few large changes. The Bitcoin Cycle Index predicts market movements using cyclical patterns, but its accuracy depends on past trends continuing. Because the market is unpredictable, statistical techniques like the Bitcoin Log Regression, which integrate several data sets to model long-term price movements, are not infallible. The Bitcoin Energy Gravity Model (BEGM) bases price on the assumption that the network's security cost equals its market worth. However, this assumption may be called into question by emerging, less energy-intensive solutions. The Pi Cycle Top Indicator also makes use of the mathematical constant Pi to forecast market peaks, yet its usefulness is questioned because of the scarcity of historical data and other market factors.

2.7. Framework Development

The strategic integration of Bitcoin into MicroStrategy's financial strategy is assessed using the Analytical Hierarchy Process (AHP), which offers a structured framework for decision-making with an emphasis on market perception, risk management, and capital structure optimization (Figure 1). This method evaluates possible effects on the cost of capital by statistically assessing Bitcoin's function as an inflation hedge and its compliance with Modern Portfolio Theory concepts (Chen, 2024). Drawing on research on cryptocurrency risk management, it also examines methods for addressing the volatility and market risks related to Bitcoin (Batten et al., 2018). Furthermore, the methodology uses insights from cryptocurrency market behavior and valuation tools to investigate how the adoption of Bitcoin impacts MicroStrategy's financial stability and investor perception

(Guesmi et al., 2019; Kajtazi & Moro, 2019). AHP facilitates the identification of the most prudent strategic courses of action by means of a weighted analysis, guaranteeing a comprehensive assessment that integrates theoretical understandings and real-world consequences of implementing Bitcoin in corporate finance.

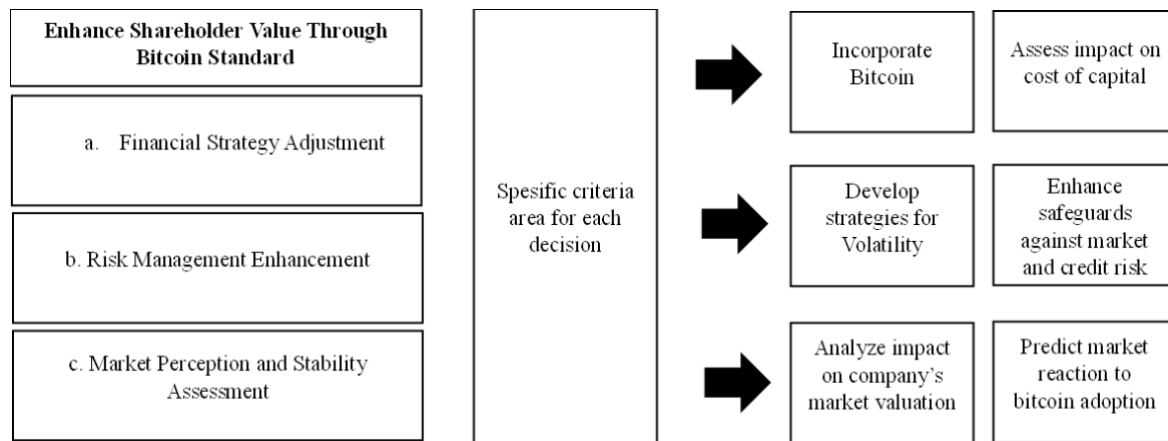


Figure 1: Framework Development

3. Research Methodology

3.1. Research Design

The Analytical Hierarchy Process (AHP) and a qualitative case study approach are used in this study to investigate how Bitcoin might be incorporated into corporate finance strategy as an inflation hedge in the Indonesian context. The qualitative method captures the challenges of integrating this financial technology by offering a thorough analysis of business executives' perspectives and tactics regarding Bitcoin's place in corporate capital structures. Concurrently, AHP is utilized as a numerical instrument to measure and rank the many hazards and advantages linked with Bitcoin, enabling strategic decision-making by ascertaining the relative significance of every criterion via professional evaluations and data gathering.

By contrasting AHP results with important stakeholder interviews, including those with executives and financial analysts at MicroStrategy in Indonesia, this mixed-method approach is further confirmed. This validation guarantees that the results accurately capture the variables influencing the decisions made about the adoption of Bitcoin, giving a strong basis for assessing financial policies in the face of economic uncertainty and useful information for maximizing shareholder value with Bitcoin.

3.2. Data Collection

Purposive sampling is used in the research on the strategic adoption of Bitcoin in Indonesian corporate finance to concentrate on MicroStrategy (MSTR) as a case study. The persons chosen for this study have particular knowledge of how Bitcoin is incorporated into corporate structures (Leavy, 2020). Semi-structured interviews with seven business owners from various industries, including digital software and FMCG, as well as corporate finance specialists were used as data collection techniques. The target companies were those with market capitalizations between USD 1 million and USD 10 million. The purpose of these interviews is to collect a range of viewpoints regarding the justification, advantages, dangers, and effects of Bitcoin on capital structure and shareholder value. The study also examines past stock market and Bitcoin prices in addition to MicroStrategy's financial reports. This adds a quantitative element by highlighting trends and correlations related to the strategy's ability to reduce inflation risks and increase shareholder value. With a comprehensive framework that guarantees findings are grounded in stakeholder perspectives and empirically validated, this combination of qualitative and quantitative data collection methods offers practitioners and researchers studying corporate finance and cryptocurrency adoption practical insights.

3.3. Data Analysis

Primary data is carefully tabulated and coded in the research on the strategic adoption of Bitcoin inside corporate finance in order to make the Analytical Hierarchy Process (AHP) via the Expert Choice Decision Analyst software easier to use. This method organizes the investigation to pinpoint and balance important variables impacting business financial plans about the use of Bitcoin. First, important variables are extracted from the data and arranged in a hierarchical structure that is unique to the incorporation of Bitcoin into corporate finance. After determining the geometric mean of these components, the study ranks the factor weights using the Eigen Vector approach within the AHP, guaranteeing consistency with a Consistency Ratio (CR) less than 0.01. In addition, the study makes use of econometric modeling to investigate how macroeconomic policies, including government expenditure, affect economic indicators over time, such as inflation rates, and how they correlate with business cash flows (Agarwal & Kimball, 2015). In the context of Bitcoin adoption, this quantitative analysis looks for causal correlations between business financial success and economic policy. The study combines results from econometric and AHP analysis to examine how Bitcoin might be used in practice to reduce costs associated with inflation on business balance sheets. In order to thoroughly assess how factors like government expenditure and the adoption of Bitcoin affect business financial strategies against inflation, the final phase synthesizes insights from both models. Its goal is to make clear these relationships and the effects they have on corporate financial resilience.

4. Results And Discussion

The research employs purposive sampling to investigate the strategic adoption of Bitcoin within corporate finance in Indonesia. Purposive sampling is particularly useful in cases where a specific population segment can provide the most pertinent information regarding the research topic. According to Leavy (2017), purposive sampling allows researchers to selectively choose individuals who possess specific experiences or insights relevant to the issue being investigated. The author employed a purposive sampling method to select the respondents for this study. Purposive sampling is a non-probability sampling technique in which the researcher relies on their judgment when choosing members of the population to participate in the study (Etikan, 2016). This sampling method is often used when the research requires a specific set of expertise or knowledge from the respondents (Palinkas et al., 2015). The author purposefully selected respondents based on their expertise, experience, and involvement in the fields of blockchain technology, cryptocurrency, and digital finance. The selection process was not random but rather targeted individuals who could provide valuable insights and contribute to a comprehensive understanding of the research topic.

Educational background was one factor, with respondents having academic expertise in relevant fields, such as those from the Bandung Institute of Technology and the University of Indonesia, chosen to provide theoretical and research-based insights (Campbell et al., 2020). Professional experience was another factor, with respondents having practical experience in the cryptocurrency and digital finance industry, such as co-founders, CEOs, and leaders of startups and established companies, selected to offer hands-on knowledge and understanding of the challenges and opportunities within the field (Margareth, 2017). The author also aimed to include respondents from various institutions, including universities, research centers, startups, and corporations, to ensure a diversity of perspectives and experiences (Robinson, 2014). The inclusion of a researcher from Monash University, Australia, suggests that the author sought to incorporate international perspectives and access to global research in the field (Maxwell & Aggleton, 2016). By purposefully selecting respondents based on these criteria, the author aimed to gather a rich and diverse set of data that would contribute to a thorough understanding of the research topic, ultimately strengthening the validity and reliability of the study's findings.

No.	Respondent Name	Position	Institution
1.	Respondent 1	Lecturer, Inventor of US index	Bandung Institute of Technology
2.	Respondent 2	Entrepreneur, co-founder	Kickavenue & Gongcha.id

No.	Respondent Name	Position	Institution
3.	Respondent 3	Researcher	Blockchain Research Joint Lab, Monash University, Australia
4.	Respondent 4	Co-Founder	Bitcoin Indonesia
5.	Respondent 5	Researcher	University of Indonesia
6.	Respondent 6	CEO	MDI Ventures Singapore
7.	Respondent 7	Co-Founder	Cryptowatch
8.	Respondent 8	Chief Digital startup, E-commerce & Fintech (DEF)	PT. Sharing Vision Indonesia
9.	Respondent 9	Co-Founder	Bull Whale

4.1. Qualitative Analysis

a. Thematic Analysis

The thematic analysis results, derived from interviews with several stakeholders, reveal diverse insights into the strategic use of Bitcoin. A variety of perspectives on how to incorporate Bitcoin into business financial strategies are revealed by the thematic analysis of interviews centered on the strategic usage of the cryptocurrency by businesses, most notably MicroStrategy. Important discoveries show that businesses like MicroStrategy have modified their capital structures to use Bitcoin as a hedge against inflation by employing special debt-financing techniques like "comfortable bonds," which are better understood by professionals in the field. Convertible bonds are used in these tactics as adaptable financial tools that fit a company's debt capacity, which is essential for maintaining creditworthiness and overseeing Bitcoin investments. Because of MicroStrategy's large investment in Bitcoin, changes in the price of the cryptocurrency have a direct impact on the performance of its stock. The possibility of implementing comparable Bitcoin investment tactics in Indonesia is examined, with an emphasis on risk mitigation and optimal Bitcoin allocation to account for local market quirks. Furthermore, the governance structure of a company—which includes voting privileges and stock classification—influences financial strategy and investment decision-making in a big way. The analysis highlights the challenges of incorporating such cutting-edge financial strategies within well-established corporate frameworks by indicating that using a company's balance sheet to manage a Bitcoin investment portfolio could have a significant impact on the portfolio's performance, leverage, and overall valuation.

b. Root Cause Analysis

One of the main obstacles to Bitcoin's limited acceptance in Indonesia, according to the root cause analysis (Table 2), is regulatory ambiguity. According to interviews, corporations are hesitant to use cryptocurrencies because they are unsure of the compliance requirements and possible liabilities resulting from the lack of a complete regulatory framework. The absence of cooperation between different regulatory organizations, such as the financial, tax, and technological authorities, exacerbates this uncertainty by leading to a fragmented regulatory strategy. Further impeding Bitcoin's integration into the Indonesian market are issues including misinformation-fueled unfavorable public opinion, inadequate financial and technological infrastructure, and the perception of Bitcoin's technological limits in comparison to other cryptocurrencies.

Table 2: Root Cause Analysis

Theme	Symptom	Potential Root Cause
Regulatory Uncertainty	<ul style="list-style-type: none"> - Unclear regulatory framework for cryptocurrencies in Indonesia - Lack of clear compliance requirements for companies 	<ul style="list-style-type: none"> - Absence of comprehensive cryptocurrency regulations and guidelines - Lack of coordination among regulatory bodies (e.g., financial, tax, and technology authorities)
Infrastructure Readiness	<ul style="list-style-type: none"> - Underdeveloped infrastructure and support systems for integrating cryptocurrencies into the Indonesian financial ecosystem - Lack of custody, custody, and security solutions tailored to the Indonesian market 	<ul style="list-style-type: none"> - Limited investment and development in cryptocurrency-related financial and technological infrastructure - Absence of specialized service providers catering to the needs of Indonesian companies
Stakeholder Perceptions	<ul style="list-style-type: none"> - Negative public sentiment and lack of awareness/understanding about the benefits and risks of Bitcoin - Reluctance among Indonesian companies to adopt Bitcoin due to potential stakeholder backlash 	<ul style="list-style-type: none"> - Prevalence of negative media coverage and misinformation about cryptocurrencies - Lack of comprehensive educational initiatives to inform the public and business community about Bitcoin and its applications
Technological Limitations	<ul style="list-style-type: none"> - Perception of Bitcoin's technological stagnation compared to other cryptocurrencies - Lack of confidence in Bitcoin's long-term viability and use cases 	<ul style="list-style-type: none"> - Insufficient innovation and development within the Bitcoin ecosystem - Limited understanding of Bitcoin's technical capabilities and potential use cases
Legal and Fiscal Complexities	<ul style="list-style-type: none"> - Ambiguity in the legal and tax treatment of Bitcoin and other cryptocurrencies in Indonesia - Uncertainty around compliance and potential liabilities for companies adopting Bitcoin 	<ul style="list-style-type: none"> - Lack of clear guidelines and alignment on the legal and tax classification of cryptocurrencies - Insufficient guidance on accounting, reporting, and tax implications for corporate Bitcoin holdings

Businesses are discouraged from embracing Bitcoin due to legal and fiscal complications, including unclear tax and legal treatment. A more favorable environment for Bitcoin and other cryptocurrencies in Indonesia could be created by addressing these underlying causes through the creation of clear regulations, better infrastructure, public education, and improved technological offerings from Bitcoin. This would mirror strategic adoptions like MicroStrategy's use of Bitcoin as a corporate asset.

4.2. Quantitative Analysis

Applying the Analytical Hierarchy Process (AHP) provides a methodical way to analyze the complex problem of Bitcoin acceptance in Indonesia. AHP allows for weighted comparisons to determine the relative relevance of various variables by organizing them into categories such as risk management, stakeholder views, technology readiness, legal and budgetary considerations, and regulatory environment. This approach, which takes into account the opinions of regulators, business leaders, and decision-makers, makes it easier to comprehend the factors that encourage and hinder the adoption of Bitcoin. By means of comprehensive interviews and AHP analysis, well-informed suggestions for improving the assimilation of cryptocurrencies into Indonesia's financial environment can be developed.

a. AHP Analysis

A structured framework with four main criteria—Stakeholder Acceptance, Optimal Allocation, Risk Mitigation, and Price Trends—has been developed based on insights from interviews to evaluate the adoption of Bitcoin in Indonesian businesses (Table 3). Stakeholder Acceptance sub-criteria include remarks made by decision-makers, investment backing, market reaction, and regulatory framework. Market volatility, diversity, liquidity, risk-reward ratio, and credit rating impact are all examined by optimal allocation. The main components of risk mitigation criteria include diversification, insurance, scenario analysis, and hedging techniques. Price Trends measures how well Bitcoin performs in comparison to market sentiment, price trends, and indexes.

Table 3: Establishment Criteria and Sub Criteria

Theme	Sub-Criteria	Relevant Quotes
Stakeholder Acceptance	Public Statements	"For corporations, it involves many people, both inside the corporation itself and from the outside. Inside the corporation, of course, includes employees, shareholders, and so on." - Chris
	Investor Support	"Given that in Indonesia itself, the adoption of Bitcoin on the retail side is still questioned. So if it's done from a corporate side, in my opinion, it shouldn't be suitable yet." - Chris
	Market Reaction	"MicroStrategy's situation is like an 'infinity money glitch.' They can create debt. And when the price of Bitcoin goes up again, then they can raise new funds." - Chris
	Regulatory and Legal Environment	"The legal and tax complexities related to crypto assets are major considerations for companies in Indonesia before adopting an investment strategy similar to MicroStrategy's." - Overview
Optimal Allocation	Market Volatility	"Speaking from a financial statement perspective, it's actually unhealthy for the company, because the calculation mode is quite biased. When high, it can significantly increase, thus raising its valuation, but when it drops, like what happened to Tesla, it drops a lot." - Jupaka
	Asset Diversification	"Investing in Bitcoin and other crypto assets like Ethereum and NFTs can be part of a diversification strategy to reduce risk." - Dimaz
	Liquidity	"Bitcoin is, in my opinion, the most liquid asset. So, I can sell it to everyone in the whole world..." - Marius
	Risk/Reward Ratio	"Initially, I was into NFTs, then started taking Bitcoin seriously, because it's one of the investment instruments. Now, I consider Bitcoin as one of the digital investment instruments." - Jupaka
	Impact on Credit Rating	"MicroStrategy's situation is like an 'infinity money glitch.' They can create debt. And when the price of Bitcoin goes up again, then they can raise new funds." - Chris
Risk Mitigation	Hedging	"To reduce risk, companies can use contracts or staking, by setting upper and lower limits for when to sell their crypto assets." - Dimaz

Theme	Sub-Criteria	Relevant Quotes
	Digital Asset Insurance	"...if possible, split into 10 wallets, some on exchanges, some in cold wallets, some in resorts, and others, to be safe..." - Jeff
	Scenario Analysis	"MicroStrategy being the first company that issues a bond for their company and buying Bitcoin with those new cash inflow has a risk of leveraging too much...what MicroStrategy is doing has not really a high risk." - Marius
	Investment Diversification	"Investing in Bitcoin and other crypto assets like Ethereum and NFTs can be part of a diversification strategy to reduce risk." - Dimaz
Price Trends	Comparison with Market Indexes	"MicroStrategy, with a Bitcoin supply of 20 million, holds 1 percent of it, and it significantly affects their stock performance. Like what Robert Kiyosaki said, the business of McDonald's isn't selling burgers; it's real estate..." - Jupaka
	Long-term and Short-term Trends	"...next month is the Bitcoin halving, usually the following year is still busy and then it will drop and the year after that it will rise again." - Jeff
	Market Sentiment Analysis	"Major players like MicroStrategy can influence Bitcoin's market price through their speculative actions." - Dimaz

The extensive framework—which was developed through interviews—defines requirements, sub-requirements, and substitute tactics for the adoption of Bitcoin in Indonesian businesses. With thorough explanations and comments from participants, it offers a reliable foundation for assessing the variables influencing Bitcoin integration. While alternative strategies (Table 4)—from Conservative Allocation to Aggressive Expansion—cater to varying risk appetites and outlooks, criteria such as Stakeholder Acceptance, Optimal Allocation, Risk Mitigation, and Price Trends offer a nuanced approach.

Table 4: Establishment Alternative

Alternative Strategy	Definition
Conservative Allocation	Maintain a cautious approach by allocating a smaller portion of the company's assets to Bitcoin (e.g., 10-20% of cash reserves). This strategy minimizes exposure to Bitcoin's volatility while still positioning the company to benefit from potential upside.
Strategic Diversification	Allocate a moderate portion of assets to Bitcoin (e.g., 20-40% of cash reserves) while also investing in other cryptocurrencies and blockchain technologies to diversify risk. This strategy balances between leveraging Bitcoin's potential and mitigating risk through diversification.
Aggressive Expansion	Significantly increase Bitcoin holdings (e.g., 50% or more of cash reserves), positioning the company as a leader in cryptocurrency adoption among publicly traded companies. This strategy bets on Bitcoin's long-term value proposition and potential for substantial returns.

Based on the provided information, a strategic evaluation of the Bitcoin investment decision has been conducted using the Analytical Hierarchy Process (AHP) method. The criteria considered include Stakeholder Acceptance (23.1%), Optimal Allocation (19.2%), Risk Mitigation (38.1%), and Price Trends (19.5%). The AHP analysis results show that the highest priority is given to Risk Mitigation, followed by Stakeholder Acceptance, Price Trends, and Optimal Allocation. With a Consistency Ratio (CR) of 1.6%, it indicates a reasonably consistent assessment. Overall, the Bitcoin investment decision is considered to have a low level of importance (AHP group consensus: 52.0% low), with the primary focus on mitigating the risks inherent in this investment.

According to the AHP analysis, the most important factor for Bitcoin investments in Indonesian enterprises is risk mitigation (38.1%), which is followed by stakeholder acceptance (23.1%), price trends (19.5%), and optimal allocation (19.2%). The overall perceived relevance of Bitcoin investment is low (AHP group consensus: 52.0% low), with a heavy emphasis on managing associated risks, despite the Consistency Ratio (CR) of 1.6% indicating decent consistency. Meanwhile, Regulatory and Legal Environment (27.8%), Market Reaction (22.8%), Public Statements (17.9%), and Investor Support (31.5%) rank top among Stakeholder Acceptance's sub-criteria, with a CR of 0.2%. Securing investor backing is a top priority, along with addressing regulatory concerns and comprehending market reactions, despite its low importance (AHP group consensus: 52.5% low).

Risk/Reward Ratio (26.7%) is the most important aspect when evaluating investment considerations. Other important factors include Asset Diversification (24.5%), Liquidity (22.7%), Market Volatility (17.5%), and Impact on Credit Rating (8.5%). The importance of prudent risk management and asset allocation is emphasized by this prioritization. Investment diversification (35.3%) is the most prioritized strategy for mitigating risk, followed by hedging (27.7%), digital asset insurance (19.9%), and scenario analysis (17.2%). The AHP group consensus indicates moderate to low agreement on these risk mitigation techniques, even though the CR is still low at 1.8%. The most important factors in price trend analysis are Market Sentiment Analysis (40.7%), Comparison with Market Indexes (33.9%), and Long-term and Short-term Trends (25.4%). Participants' preferences exhibit a large variation (AHP group consensus: 57.7% extremely low) despite a steady CR of 2.3%. This disparity reflects varying reliance on different techniques for interpreting price changes (Figure 2).

Alternative Result

With 51.2% of the total preference, Strategic Diversification is the preferred option in the decision-making framework. This suggests a significant preference for dispersing opportunities and risk through a variety of avenues. Aggressive Expansion, on the other hand, only receives 19.3%, indicating a cautious attitude toward high-risk, high-reward projects. At 29.5%, Conservative Allocation falls in the middle and represents a substantial but cautious approach to resource allocation and capital investment. Overall, this distribution shows that diversity is clearly preferred over aggressive expansion and conservative preservation measures.

Conservative Allocation

The data provided appears to be a set of weighted values assigned to various factors under a "Conservative Allocation" strategy at Level 2, which suggests a hierarchy or a multi-tiered decision-making process. Each factor, ranging from Public Statements to Long-term and Short-term Trends, has been assigned a numerical value, presumably representing its relative importance or weight in the context of a conservative strategic approach. For instance, factors such as the Impact on Credit Rating (0.413194444) and Regulatory and Legal Environment (0.40625) have been assigned higher weights, indicating they are of substantial importance in the conservative allocation framework, likely due to their significant implications for stability and compliance. In contrast, Asset Diversification (0.175694444) and Long-term and Short-term Trends (0.186805556) hold lower weights, suggesting they are considered less critical within this conservative paradigm. Digital Asset Insurance and Hedging also receive a high emphasis, marked at 0.4 and 0.390972222 respectively, pointing towards a risk-averse attitude that prioritizes safeguards against potential financial uncertainties.

Decision Hierarchy					
Level 0	Level 1	Level 2		Glb Prio.	
Strategic Evaluation of Bitcoin Decision	Stakeholder Acceptance	Public Statements	0.179	4.1%	
		Investor Support	0.315	7.3%	
		Market Reaction	0.228	5.3%	
		Regulatory and Legal Environment	0.278	6.4%	
	Optimal Allocation	0.192	Market Volatility	0.175	3.4%
			Asset Diversification	0.245	4.7%
			Liquidity	0.227	4.4%
			Risk/ Reward Ratio	0.267	5.1%
			Impact on Credit Rating	0.085	1.6%
	Risk Mitigation	0.381	Hedging	0.277	10.5%
			Digital Asset Insurance	0.199	7.6%
			Investment Diversification	0.353	13.4%
			Scenario Analysis	0.172	6.5%
	Price Trends	0.195	Comparison with Market		6.6%
			Indexes	0.339	

Figure 2: Decision Hierarchy

Strategic Diversification

The values outlined under "Level 2 Strategic Diversification" suggest a tiered approach where varying degrees of importance are assigned to each financial and market consideration within the context of a strategic diversification framework. Notably, Asset Diversification is emphasized the most with a weight of 0.432638889, aligning with the core tenet of strategic diversification which aims to spread exposure across various assets to mitigate risk. Investment Diversification and Long-term and Short-term Trends also receive considerable weightings, at 0.365972222 and 0.396527778 respectively, indicating a focus on a broad investment spectrum and an emphasis on understanding market dynamics over time. Conversely, elements such as Hedging, Digital Asset Insurance, and the Risk/Reward Ratio are assigned relatively lower values, suggesting a lesser focus on these areas within the diversification strategy at this level. The moderate weights given to Public Statements, Liquidity, and Scenario Analysis reflect a balanced consideration of market perceptions, financial flexibility, and predictive planning.

Aggregate Expansion

The "Level 2 Aggressive Expansion" data presents a framework for allocating importance to various market and investment factors within an aggressive growth strategy. Categories like Risk/Reward Ratio (0.13333333) and Market Sentiment Analysis (0.11875) are given relatively higher emphasis, suggesting a key interest in the potential high returns associated with higher risks and a keen sense of how the market's mood may present opportunities for rapid growth. Conversely, elements such as Public Statements and Investor Support are assigned the lowest weights (0.072916667 and 0.070138889, respectively), indicating that while these factors are still considerations, they may take a backseat to more direct growth indicators in the aggressive expansion model. Hedging, although typically a defensive strategy, has been given a moderate weight (0.125694444), which could reflect a necessity to manage the increased risks inherent in aggressive expansion pursuits.

4.3. Discussion and Implementation Plan

The regulation of Bitcoin in Indonesia has evolved through various laws and regulations. For instance, BAPPEBTI Regulation No. 5 of 2019 states that although Bitcoin is not recognized as a legal means of payment, it is recognized as a crypto asset that can be traded on the Physical Market for Crypto Assets. Additionally, BAPPEBTI Regulation No. 11 of 2022 mandates that crypto assets like Bitcoin must be supervised and guarded by BAPPEBTI through special inspections at least once a year. These regulations reflect the Indonesian government's efforts to regulate the trading and management of Bitcoin, despite the limitations in its use as an official means of payment. Despite the evolving regulations, the adoption of Bitcoin as a corporate asset in Indonesia is still in its early stages, with many companies just becoming aware of the opportunities and challenges associated with managing digital assets (Suraya et al., 2022; Susanto et al., 2021). Factors such as the lack of clear regulations, the perceived complexity of managing digital assets, and limited understanding of the technology among decision-makers have contributed to the slow adoption rate. However, as awareness of Bitcoin's potential benefits increases and the regulatory environment becomes clearer, it is expected that more Indonesian companies will start to consider integrating Bitcoin into their corporate asset portfolios (Wicaksono, 2023).

The quantitative AHP method reveals that risk mitigation emerges as the primary priority (38.1%) for companies considering Bitcoin adoption in Indonesia (Analytical Hierarchy Process Analysis). Companies in Indonesia need to implement robust risk mitigation strategies, such as investment diversification, hedging, and scenario analysis, to minimize the risks inherent in holding Bitcoin. The AHP analysis underscores the importance of strategies like diversification (35.3%), hedging (27.7%), digital asset insurance (19.9%), and scenario analysis (17.2%) in mitigating risk (Analytical Hierarchy Process Analysis). However, the literature suggests that the effectiveness of these strategies may depend on factors such as the company's risk tolerance, investment horizon, and the overall regulatory environment in Indonesia (Symitsi & Chalvatzis, 2018; Suraya et al., 2022). This finding aligns with the literature that highlights the price volatility of Bitcoin and the challenges associated with managing digital assets (Karabulut & Sari, 2022; Susanto et al., 2021).

Stakeholder acceptance, encompassing investors, regulators, and market sentiment, is identified as the second most crucial factor (23.1%) in Bitcoin adoption in Indonesia (Analytical Hierarchy Process Analysis). This resonates with the literature emphasizing the need for investor support (Wicaksono, 2023) and a supportive regulatory environment in Indonesia (Suraya et al., 2022). The AHP analysis highlights the importance of factors such as regulatory and legal environment (27.8%), market reaction (22.8%), public statements (17.9%), and investor support (31.5%) within the stakeholder acceptance criteria in Indonesia (Analytical Hierarchy Process Analysis). Companies in Indonesia must convince stakeholders of Bitcoin's potential and address concerns related to legal and accounting complexities, which are particularly relevant in the Indonesian context due to the lack of clear guidance from accounting standards like PSAK (Anthony et al., 2022).

Bitcoin price trends (19.5%) and optimal asset allocation (19.2%) are also significant considerations in the adoption decision for Indonesian companies, as identified by the AHP analysis (Analytical Hierarchy Process Analysis). The literature acknowledges Bitcoin's potential for long-term growth (Ramadhani, 2022), which could be attractive for Indonesian companies looking to increase their overall return on investment. The importance of

analyzing price trends and market sentiment is also highlighted (as cited by Dimaz in the data), which is particularly relevant in the Indonesian context, where Bitcoin adoption is still in its early stages (Suraya et al., 2022). The AHP analysis further emphasizes the relevance of factors like market sentiment analysis (40.7%), comparison with market indexes (33.9%), and long-term and short-term trends (25.4%) in assessing price trends for Indonesian companies (Analytical Hierarchy Process Analysis). Indonesian companies need to closely monitor price trends and optimize asset allocation by considering factors such as diversification, liquidity, and risk/reward ratios.

The AHP analysis identifies the Strategic Diversification strategy as the most preferred alternative (51.2%) for Bitcoin adoption among Indonesian companies (Analytical Hierarchy Process Analysis). This finding aligns with the diversification principles of Modern Portfolio Theory (MPT) (Kajtazi & Moro, 2019; Messica, 2018) and the literature advocating asset diversification to manage risk (Guesmi et al., 2019), which could be particularly relevant for Indonesian companies navigating the volatile cryptocurrency market. The AHP analysis further emphasizes the importance of factors such as asset diversification (43.3%), investment diversification (36.6%), and long-term and short-term trends (39.7%) within the strategic diversification approach for Indonesian companies (Analytical Hierarchy Process Analysis). Indonesian companies can consider allocating a portion of their assets to Bitcoin while investing in other cryptocurrencies to spread risk.

Although not explicitly discussed in the AHP results, the literature highlights the accounting and financial reporting challenges associated with Bitcoin as a significant hurdle for Indonesian companies (Anthony et al., 2022; Ramadhani, 2022). The lack of clear accounting guidance from PSAK (Indonesian Financial Accounting Standards) can cause Indonesian companies to hesitate in integrating Bitcoin into their financial statements, fearing its impact on reported financial performance. As suggested by (Karabulut & Sari, 2022), the absence of clear accounting standards can reduce comparability between companies and potentially mislead investors, underscoring the need for a comprehensive framework to address this issue in the Indonesian context. The development of consistent accounting standards and regulatory guidance is crucial to ensure transparent financial reporting for Indonesian companies adopting Bitcoin.

The implementation strategy addresses important aspects like infrastructure, education, risk management, legislation, and real-world testing with the goal of promoting the use of Bitcoin among Indonesian firms. Cooperation with financial regulators such as OJK and Bank Indonesia is essential in order to determine Bitcoin's legal status and create tax regulations. Partnerships with industry groups and accounting bodies ensure sectoral alignment. Knowledge transfer initiatives and international custody alliances are necessary to provide secure infrastructure. Education initiatives clear up misconceptions, and accredited training courses and forums facilitate stakeholder awareness. Companies may overcome risks and acquire useful insights by utilizing real-world pilot projects and robust risk management systems. Continual enhancement, overseen by a specialized task force, guarantees flexibility in response to worldwide developments.

While the adoption of Bitcoin as a corporate asset is still in its early stages in Indonesia, other countries have shown a more progressive approach. For instance, in the United States, companies like MicroStrategy and Tesla have made significant investments in Bitcoin, with MicroStrategy holding over 130,000 BTC as part of its corporate treasury strategy (Saundal, 2021). Similarly, several publicly listed companies in Canada, such as Galaxy Digital Holdings and Hut 8 Mining Corp, have also embraced Bitcoin as a strategic asset (Férdeline, 2022). These examples showcase a more advanced level of Bitcoin adoption and provide a benchmark for Indonesian companies to consider as the regulatory and market conditions evolve.

Furthermore, countries like Singapore and Switzerland have established themselves as crypto-friendly jurisdictions, with clear regulatory frameworks and supportive policies for businesses dealing with digital assets. In Singapore, the Payment Services Act provides a licensing regime for crypto businesses, enabling greater transparency and investor protection (Alekseenko, 2022). Switzerland has also taken steps to incorporate blockchain and cryptocurrencies into its legal and regulatory framework, positioning itself as a hub for crypto and fintech innovation (Pavlidis, 2021). These examples demonstrate how a supportive regulatory environment can foster the adoption of cryptocurrencies like Bitcoin within the corporate sector.

5. Conclusion

The world has taken notice of MicroStrategy's courageous decision, spearheaded by CEO Michael Saylor, to use Bitcoin as its main treasury reserve asset. The corporation uses debt instruments such as convertible bonds to allocate cash reserves to Bitcoin in a deliberate manner, citing its superior store of value. MicroStrategy's strategy has drawn mixed reviews, but it may establish a precedent for corporate Bitcoin adoption, which might have an effect on stock price and performance. This plan provides Indonesian businesses with a template for capital restructuring as a means of battling inflation. Improving shareholder value and protecting against inflation are two advantages of customizing it for the local market. In order to successfully implement and establish Indonesian firms as leaders in the invention of digital assets, collaboration among stakeholders is essential.

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"Carbon Spectacular" - Exploring the Path to Enhance the Precision of Fiscal and Tax Support for Innovative Technologies in Energy Conservation and Emission Reduction

Siyi Xu¹, Jiachen Shou², Qiuqin Yang³, Huaiwen Wang⁴, Shunan Sheng⁵, Weihua Gao⁶

^{1,2,3,4,5,6} Zhejiang University of Finance and Economics Dongfang College, Jiaxing, Zhejiang, China

Correspondence: Siyi Xu, Zhejiang University of Finance and Economics Dongfang College, Jiaxing, Zhejiang, China. Tel: 1360-051-0408. E-mail: 391134110@qq.com

Abstract

Since the 18th National Congress of the Communist Party of China, China has always placed technological innovation at the core of its development. In today's world, under the background of advocating "green manufacturing," energy conservation and emission reduction are the inevitable path to sustainable green development. This article primarily utilizes the method of data analysis to analyze the issues existing in fiscal and tax preferential policies in promoting technological innovation from the perspectives of literature review and tax preferential policy combing. These issues include the current fiscal and tax preferential policies leading enterprises to pursue the quantity rather than the quality of innovation, high policy thresholds, difficulties in expense allocation, limitations in tax incentives from multiple perspectives, and insufficient support for innovative talents in fiscal and tax policies. Based on these issues, a series of operable suggestions are proposed. It is hoped that this study can contribute to the revision and improvement of fiscal and tax preferential policies for technological innovation in energy conservation and emission reduction, providing effective theoretical references and inspirations.

Keywords: Energy Conservation and Emission Reduction, Fiscal and Tax Policies, Technological Innovation

1. Research Background and Purpose

Energy conservation and emission reduction have become the main theme in addressing global warming and energy shortages, representing the inevitable path towards sustainable development. In response, China has continuously promoted and implemented energy conservation, emission reduction, and green development. By 2023, China's energy consumption intensity has declined by 26.4% cumulatively, reducing carbon dioxide emissions by nearly 3 billion tons and emissions of sulfur dioxide and nitrogen oxides by over 10 million tons. However, industrial energy consumption, accounting for approximately 70% of the country's total social energy consumption, still faces issues such as low energy efficiency in many existing projects and insufficient energy-saving innovation technology in industrial parks.

Amid the rapid development of the internet, it is imperative to deepen the integration of manufacturing and the internet to implement "Made in China 2025", promoting the advancement, intelligence, greening, and servicing of the manufacturing industry. It is necessary to build a green manufacturing system, promote green management throughout the product's lifecycle, and continuously optimize the industrial product structure. This research focuses on technological innovation in energy conservation and emission reduction. Through literature analysis, it examines the incentivizing role of fiscal and taxation policies on energy conservation, emission reduction, and green development. By analyzing the existing fiscal and taxation policies for energy-saving technologies, it aims to address the lack of targeted policies and proposes feasible suggestions to further refine and enhance China's fiscal and taxation policies for encouraging technological innovation in energy conservation and emission reduction.

2. Literature Review

As a crucial economic regulation tool, fiscal and taxation policies play a significant role in resource allocation, enhancing technological innovation capabilities, promoting energy conservation and emission reduction, and driving economic development. To adapt to the development of the world economy and technological trends, China has continuously increased its investment in technological innovation for energy conservation and emission reduction since the reform and opening up, gradually intensifying fiscal and tax support measures. It utilizes fiscal subsidies, tax incentives, and other means to promote technological innovation in energy conservation and emission reduction, thus driving high-quality economic development in China. Existing relevant research primarily focuses on the following aspects:

2.1 Achievements and Deficiencies of China's Fiscal and Tax Policy System for Energy Conservation and Emission Reduction

The National Eleventh Five-Year Plan Outline and the "Several Opinions of the State Council on Accelerating the Development of Circular Economy" clearly stipulate specific goals for energy conservation and emission reduction from 2006 to 2010. Ma Haitao and Qiu Xiaojie (2010) analyzed fiscal and tax policies for encouraging energy conservation and emission reduction from the perspective of circular economy, thoroughly examining the achievements and deficiencies of fiscal and tax policies in this area. They proposed measures and suggestions suitable for China's national conditions at that time, such as establishing a green tax system, improving taxes and fees, and improving the trading of emission rights. Ma Haitao and Cheng Lan (2010) discussed fiscal and tax policies for promoting energy conservation and emission reduction by analyzing the practical pressures in achieving energy conservation and emission reduction in China. They specifically explored the relationship between energy conservation and emission reduction and fiscal policy, conducted in-depth research on fiscal and tax policies, and proposed existing defects. Zhang Xiaolong (2017) analyzed statistical bureau data and found issues in industrial development and defects in fiscal, tax, and financial policies during industrial upgrading under China's energy conservation and emission reduction trend. Wu Hong and Wang Hao (2023) explored the advantages and disadvantages of China's tax policies for energy conservation and emission reduction from the perspective of consumption tax. They proposed that to achieve the "dual carbon" goals, it is necessary to leverage the role of consumption tax in energy conservation and emission reduction, optimize the collection process, implement ad valorem taxation, and design tax rates that consider the application of energy-saving technologies.

2.2 Insights from Foreign Fiscal and Tax Policies for Promoting Energy Conservation and Emission Reduction

Song Xiaojing (2012) derived four insights by examining fiscal and tax policies of major foreign countries to promote energy conservation and emission reduction. For example, different reform models should be chosen based on national conditions, and fiscal and tax policies that emphasize both positive incentives and reverse constraints should be implemented. Jin Ying (2014) explored policies for promoting technological innovation in energy conservation and emission reduction in countries such as the Netherlands and Germany and found that developed countries would subsequently focus more on technological and policy innovations in this area. Liu Chanchan and Lan Jiajia (2022) listed relevant experiences in promoting technological innovation in green and low-carbon fiscal and tax policies in developed countries.

2.3 The Impact of Fiscal and Tax Incentive Policies on Enterprise Technological Innovation

Research conducted by Zeng Yifen (2023) has revealed that fiscal subsidies and tax incentives significantly motivate enterprises' R&D investments. Specifically, the incentive effect of fiscal and tax policies on non-state-owned enterprises' R&D investments is notably greater than that on state-owned enterprises. Additionally, the level of regional marketization can significantly enhance the incentive effect of fiscal and tax policies on R&D investments in high-tech enterprises. However, Si Jinmiao (2023) holds a different view, arguing that while appropriate fiscal subsidies can promote enterprise R&D investments and incentivize innovation, excessive fiscal subsidies may lead to a phenomenon of "the more subsidies, the greater losses." Furthermore, tax rate incentives can have an inhibitory effect on enterprise technological innovation. Guo Qing (2023) found through empirical research that fiscal subsidy policies have a more positive impact on promoting enterprise technological innovation compared to tax incentive policies. Specifically, fiscal subsidy policies have a stronger positive impact on technological innovation performance in state-owned military enterprises than in non-state-owned ones, while tax incentive policies have a stronger positive impact on technological innovation performance in non-state-owned military enterprises than in state-owned ones.

2.4 An Exploration of Fiscal and Tax Policies for Promoting Green Technological Innovation

From a circular economy perspective, Xu Jingting and Zhang Bing (2011) proposed that China should formulate fiscal and tax policies to promote green technological innovation and adjust and improve the current tax system to encourage enterprises' green technological innovation. Zhang Xiufeng, Jin Yingying, and Tang Haiyan (2023) found through their research on green technological innovation in photovoltaic enterprises that fiscal and tax incentive policies have a significant positive impact on green technological innovation in photovoltaic listed companies, with R&D investment playing a partial intermediary role. From the perspective of corporate internal governance, Ni Xinyu (2023) proposed that under the premise of good corporate governance, a fiscal and tax policy system should be actively constructed to support the achievement of green innovation performance goals. It is also necessary to establish a systematic fiscal and tax policy guidance plan to promote green R&D expenditures, further improve tax incentives for the new energy industry, and actively play the guiding role of corporate governance in the new energy industry.

By reviewing existing literature, we can observe that: firstly, there are still deficiencies in the design and implementation of fiscal and tax policies for energy conservation and emission reduction in China. Secondly, it is evident that developed countries are constantly innovating energy-saving and emission-reduction technologies, and research on fiscal and tax support policies for technological innovation in energy conservation and emission reduction has become a key area of their future research, highlighting the importance of exploring fiscal and tax policies for technological innovation in energy conservation and emission reduction. Thirdly, most of the current domestic research focuses on the impact of fiscal and tax policies on technological innovation in specific industries, while research on fiscal and tax support policies for green technological innovation in energy conservation and emission reduction is relatively scarce compared to the former. Based on the above, this paper will conduct an in-depth exploration of fiscal and tax policies for innovative technologies in energy conservation and emission reduction, analyze the existing problems in China's fiscal and tax incentives for promoting technological innovation in energy conservation and emission reduction, and propose relevant policy improvement suggestions.

3. Sorting out tax and fiscal incentives policies

3.1 Fiscal Subsidy Policy

Fiscal subsidies primarily provide enterprises with non-repayable financial support in the form of grants, loan interest subsidies, and other mechanisms, serving as a pre-emptive incentive policy. As a direct means of government support for enterprise research and development (R&D), fiscal subsidies aim to promote enterprises' willingness to invest in R&D while alleviating their financial burdens and reducing obstacles to their R&D efforts

(2024). In response to the "Opinions of the CPC Central Committee and the State Council on Comprehensively Implementing the New Development Philosophy to Achieve Carbon Peak and Carbon Neutrality," which calls for "increased fiscal support from all levels for energy conservation and emissions reduction, green and low-carbon industrial development, technological R&D, and other areas," various localities have successively introduced subsidy policies.

3.1.1 Policy subsidy review of certain regions

Policy implementation location	Policy content	Policy sources
Heilongjiang	On March 2, 2023, enterprises that meet the conditions for energy-saving renovation will be granted a reward of 1 million yuan. Enterprises that have been recognized as national-level green factories or green supply chain management enterprises in the previous year will be given a one-time reward of 1 million yuan. In the same year, the same enterprise is only allowed to apply for one reward fund specified in this guideline, and energy-saving renovation enterprises that have already received national or provincial financial support are not allowed to apply repeatedly.	Notice on Organizing the Application for Reward Funds for Energy Conservation, Carbon Reduction, and Green Transformation of Industrial Enterprises in 2023
Shenzhen Nanshan District	For enterprises that have obtained national green product certification, low-carbon product certification certificates, or certification certificates based on the "Nanshan District Green and Low-carbon Product Evaluation Rules," a reward of 100,000 yuan will be given for each certificate, with a maximum of 300,000 yuan for each enterprise. For enterprises that have obtained the "Carbon Neutral Enterprise" certification, a one-time reward of 100,000 yuan will be given. For enterprises that have set carbon neutral path goals and reduced their annual total carbon emissions by no less than 5% and carbon emission intensity by no less than 5%, a one-time reward of 300,000 yuan will be given.	Measures of the Nanshan District to Boost the High-Quality Development with the Assistance of Ecological Environment
Tianjin	1. Energy-saving technology renovation project: the investment amount of the project shall be no less than 2 million yuan, and the annual energy saving amount shall be no less than 1,000 tons of standard coal. According to the annual energy saving amount of the project, the energy-consuming unit shall be given a financial subsidy of 400 yuan per ton of standard coal. The subsidy shall not exceed 4 million yuan and 30% of the total investment of the project.	Notice on Applying for Subsidies of Special Fund for Energy Conservation and Carbon Reduction in Tianjin in 2023

	2. Low-carbon technology demonstration project: advanced and applicable technology demonstration projects such as low-carbon/zero-carbon smelting and full-process large-scale carbon capture, utilization, and storage (CCUS). The investment amount of the project shall be no less than 20 million yuan, and a subsidy of 10% of the investment amount shall be given. The subsidy shall not exceed 4 million yuan.	
Shanghai - Baoshan District	Enterprises that are supported to carry out green creation and are identified as national-level green factories will be awarded a one-time reward of 600,000 yuan; those identified as Shanghai green factories will be awarded a one-time reward of 300,000 yuan. (The Measures shall be implemented since January 1, 2020, and remain valid until December 31, 2024.)	Management Measures for the Use of Special Funds for Energy Conservation and Emission Reduction in Baoshan District

3.2 tax incentives

Tax incentives mainly reduce the tax burden of enterprises by directly reducing taxes or delaying the tax payment time, which is a kind of ex post incentive policy. Both fiscal subsidies as an ex ante incentive and tax incentives as an ex post incentive can be directly used for R&D investment to offset the risks and costs of R&D. Since the 18th CPC National Congress, China has actively promoted the green reform and transformation of the tax system, gradually built a green tax system with Chinese characteristics, and issued a series of tax and fee preferential policies to support green development in accordance with the strategic requirements of green development and ecological civilization construction.

3.2.1 Value-Added Tax

	Policy Content	Policy sources
exempt from VAT (Value-Added Tax)	1. Energy-saving service companies implementing eligible contract energy management projects that transfer value-added tax taxable goods to energy-consuming enterprises are temporarily exempt from value-added tax.	Finance and Taxation [2010] No. 110
	2. Major technological equipment within the scope of the import catalogue is exempt from value-added tax.	Finance and Tariff [2019] No. 38
	3. Full refund of VAT for domestic-funded R&D institutions and foreign R&D centers purchasing domestic equipment.	Announcement of the Ministry of Finance, Ministry of Commerce, and the State Taxation Administration [2023] No. 41

additional deduction for value-added tax	1. Taxpayers of productive service industries are allowed to offset the tax payable by adding 5% to the deductible input tax amount in the current period. Taxpayers of living service industries are allowed to offset the tax payable by adding 10% to the deductible input tax amount in the current period.	Announcement No. 87 of 2019 of the Ministry of Finance and the State Taxation Administration
	2. For the industrial machine tool enterprises that produce and sell advanced industrial machine tool mainframes, key functional components, and numerical control systems, a 15% additional deduction of the current deductible input tax is allowed for their taxable income	Tax and Taxation[2023] No. 25

3.2.2 Corporate Income Tax

	Policy Content	Policy sources
Additional deduction for research and development expenses	As for the actual R&D expenses incurred by enterprises during their R&D activities, if they do not form intangible assets and are included in the current profits and losses, on the basis of deducting them according to the regulations, starting from January 1, 2023, they can be further deducted before tax at 100% of the actual amount. If they form intangible assets, starting from January 1, 2023, they can be amortized before tax at 200% of the cost of intangible assets.	The Announcement of the Ministry of Finance and the State Taxation Administration No. 7, 2023
Accelerated Depreciation of Fixed Assets	For newly purchased equipment and instruments, if the unit value does not exceed 5 million yuan, they are allowed to be included in the current cost and expenses for deduction in calculating taxable income, without calculating depreciation year by year. If the unit value exceeds 5 million yuan, it shall still be subject to relevant regulations.	Announcement of the Ministry of Finance and the State Taxation Administration [2023] No. 37
Three-Year Tax Exemption Followed by Three-Year Half-Tax Reduction	1. As for the income from environmental protection and energy-saving water-saving projects that meet the conditions, it is exempt from enterprise income tax in the first three years since the first year in which the first production and operating income is generated. From the fourth to the sixth year, it shall be taxed at a rate reduced by half.	Finance and Taxation [2016] No. 131
	2. For the qualified energy-saving service companies implementing contract energy management projects in accordance with relevant provisions of the Enterprise Income Tax Law, from the tax year in which the project obtains the first production and operation income, the first to third years are exempted from the enterprise income tax, and the fourth to sixth years shall be taxed at half of the statutory tax rate of 25%.	Finance and Taxation [2010] No. 11

Tax rate concession	1. For high-tech enterprises which the country aims to give priority to in terms of support, the enterprise income tax will be levied at a reduced rate of 15%.	The Enterprise Income Tax Law of the People's Republic of China
	The enterprise income tax shall be levied at a reduced rate of 15% for the third-party enterprises engaged in pollution prevention and control that meet the requirements.	Announcement of the Ministry of Finance and the State Taxation Administration [2019] No. 60

3.2.3 personal income tax

The fiscal and tax incentives for technological innovation in terms of personal income tax mainly include the following two:

- (1) If an individual resident obtains stock options, stock appreciation rights, restricted stocks, equity incentives, etc., and meets relevant conditions, it will not be merged into the comprehensive income of the current year, and the individual income tax will be calculated and paid by applying the comprehensive income tax rate table in full and independently.
- (2) Since July 1, 2018, non-profit research and development institutions and universities approved by law, according to the Law of the People's Republic of China on Promoting the Transformation of Scientific and Technological Achievements, can reduce the cash rewards given to scientific and technological personnel from the income of the transformation of scientific and technological achievements to 50% of the "salary and wage income" of the scientific and technological personnel in the current month, and pay individual income tax in accordance with the law.

3.2.4 other taxes

(1) Resource tax

To encourage the intensive exploitation and utilization of coal resources, from September 1, 2023 to December 31, 2027, the resource tax on coal replaced by backfill mining will be reduced by 50%.

(2) Real estate tax and urban land use tax

From January 1, 2024 to December 31, 2027, the real estate tax and urban land use tax will be exempted for the real estate and land used by national and provincial science and technology business incubators, university science parks, and national registered maker spaces, and the real estate and land provided to incubating objects through free or rental methods.

4. Problems in promoting fiscal and tax preferential policies for technological innovation in energy conservation and emission reduction

4.1 Preferential fiscal and tax policies lead enterprises to pursue the quantity rather than the quality of innovation

4.1.1 Preferential fiscal and tax policies have limitations of "true innovation" incentives

Preferential fiscal and tax policies are the main means of national macroeconomic regulation and control, mainly through fiscal subsidies, tax incentives, government procurement and other ways to achieve the purpose of benefiting enterprises and reducing the investment cost of enterprises to promote the development of enterprises. However, the current preferential fiscal and tax policies have the limitations of "true innovation" incentives. Today, with the rapid development of science and technology, the emergence of many strategic innovations has inhibited the process of "true innovation" to a certain extent. The 18th National Congress of the Communist Party of China proposed that scientific and technological innovation should be placed in the core position. The state provides many tax breaks, subsidies and interest-free policies to innovative technology enterprises in terms of investment and financing, technology development, enterprise growth and technology formation. However, in a society with poor information, many enterprises will exploit the "tax loophole" and innovate to enjoy preferential policies, which is not "true innovation." If they carry out the imitation innovation model, these enterprises will have a small amount of input, but there is no final output; Or they may increase a lot of non-high-quality research and development results in a period, but do not care about quality, just to enjoy tax incentives for their own enterprises to pay less tax innovation activities.

4.1.2 Preferential fiscal and tax policies are less favorable for enterprises in the start-up stage

An enterprise from the beginning to the final foothold, need to go through the initial stage, growth, maturity, decline and other processes. At present, most of the preferential policies introduced in China are aimed at those small and medium-sized enterprises that have been in the research and development link, more preferential policies for the growth period and mature period of enterprises, but for the start-up stage of the preferential policies involved less. Financing ability is often an important factor to promote the development of enterprises, small and medium-sized science and technology enterprises in the start-up is the need for a lot of capital, a lot of manpower, a lot of talent introduction of the period, and technology research and development of this high-tech industry, sufficient capital supply for technology research and development escort. At this stage, enterprises often face financing difficulties and other financial problems, but at this stage, the scale of enterprises is still small, direct and indirect financing difficulties, and the state only issued financial institutions to small and micro enterprises and individual industrial and commercial enterprises 10 million yuan and below small loans interest income from VAT exemption policies, preferential policies in the enterprise financing incentive range is small. Enterprises rely on external financing to obtain funds in the initial stage, which does not solve the problem of financing difficulties for enterprises in the initial stage to a certain extent and makes some people who want to start innovative enterprises discouraged.

Talent introduction is the foundation of innovation-oriented enterprises, but at present, there are few fiscal and tax preferential policies for technical personnel, which is very unfavorable to the cultivation and investment of talents. The preferential policies related to talent training are not strong enough. China only reduces or postpones the personal income tax of employees in enterprises according to a certain percentage or within a certain period, or makes enterprises enjoy a lower corporate income tax rate or reduce part of the corporate income tax within a certain period, or reduces the tax related to scientific research expenses, and carries out a certain subsidy or tax reduction for technological innovation projects. These preferential policies do not produce substantial incentives for talent training, enterprises did not increase investment in talent training, so the quality of talent training is not high in our country, the lack of high-quality talent resources, which also leads to the low level of enterprise innovation.

4.1.3 Preferential fiscal and tax policies have low efforts to transform innovative technological achievements

Patent is the core factor to measure the innovation ability of an enterprise the number of patent applications can reflect the innovation ability of an enterprise to some extent. The invention patent is an important symbol to measure the level of independent innovation ability of an enterprise. Invention patents are the patents with the highest technical content, internal value and research and development difficulty. At present, although the number of patents granted by Chinese enterprises shows an overall upward trend, the number of invention patents is far lower than that of utility model, design and other patents. Every year, about 40% of patents in China cannot pass the audit and certification due to technical substandard reasons. It shows that the quality of innovation patents in

China is not high. However, for small and medium-sized innovative enterprises, they would prefer to invest in technical achievements that meet customer needs, have a short cycle and a high conversion rate. However, at present, there are few relevant fiscal and tax preferential policies, which are not conducive to the achievements and outputs of small and medium-sized innovative enterprises. Therefore, not all the funds invested by these enterprises can be finally converted into output results. The preferential fiscal and tax policies for the transformation of technological achievements are mainly reduced and deferred tax on technology shares, but this preferential policy only makes the technology research and development personnel defer the tax payment to the transfer of equity, but extends the tax period, and does not substantially reduce the tax burden. The preferential intensity is small, and the scope of the preferential policy is not large. If the technical and innovative personnel get cash incentive rather than equity incentive, the tax burden will be heavier. This is because the bonus will be fully taxed as salary and salary in comprehensive income, and the tax rate may be as high as 45%, which is much higher than the 20% tax rate on property transfer as equity transfer.

4.2 The threshold of preferential fiscal and tax policies is high, and the collection of expenses is difficult

4.2.1 High policy threshold

For the current high-tech enterprises, if the enterprise wants to enjoy the "two exemptions and three halves" policy, the enterprise first needs to meet the relevant provisions of the "high-tech enterprise identification Management Measures", obtained the high-tech enterprise identification certificate, can enjoy the preferential treatment. However, if the enterprise wants to enjoy the preferential policy of tax reduction and exemption every year in the future, it needs to meet the identification conditions every year in the future. If the tax department finds during daily management that the high-tech enterprise does not meet the conditions of recognition in the process of recognition or during the preferential period, it shall request the recognition institution to recombine. After the review, it is determined that the enterprise does not meet the conditions, the qualification of new and high technology enterprises shall be cancelled, and the tax authorities shall be notified to recover the taxes that are not in conformity with the provisions but are underpaid while enjoying tax incentives, and the enterprises shall be notified to pay the taxes in arrearage.

For example, although China has given a large number of preferential policies to micro, small and medium-sized enterprises, there are strict conditions for the identification of small and micro enterprises: for industrial enterprises, the annual taxable income should not exceed 300,000 yuan, the number of employees should not exceed 100 people, and the total assets should not exceed 30 million yuan; For other enterprises, the annual taxable income should not exceed 300,000 yuan, the number of employees should not exceed 80 people, and the total assets should not exceed 10 million yuan. Another example is that for high-tech enterprises that need key support from the state, the enterprise income tax shall be levied at a reduced tax rate of 15%. For the "high-tech enterprises" mentioned in this preferential fiscal and tax policy, the tax law strictly stipulates that they must meet the following six conditions at the same time: (1) have core independent intellectual property rights; (2) the product (service) belongs to the scope stipulated in the "high-tech fields supported by the State"; (3) the proportion of research and development expenses in sales revenue shall not be less than the prescribed proportion; (4) the proportion of the revenue of high-tech products (services) in the total revenue of the enterprise shall not be less than the prescribed proportion; (5) the proportion of scientific research personnel in the total number of employees of the enterprise shall not be less than the prescribed proportion; (6) other conditions stipulated in the measures for the administration of the identification of new and high technology enterprises.

4.2.2 Difficulty in collecting expenses

Research and development expenses are the tax basis of enterprise income tax. If enterprises do not collect research and development expenses in a standardized way, it may make it difficult for enterprises to calculate the deduction of enterprise income tax research and development expenses. Some enterprises, due to less understanding of relevant preferential policies, may mistakenly list an expense that does not belong to the scope of R&D expenses in the collection of R&D expenses, resulting in the deduction of a part of the expense, reducing the tax payable by the enterprise. For example, travel expenses of research and development personnel not caused by research and

development projects do not belong to the category of research and development expenses, and should be excluded and included in research and development expenses. In addition, the financial personnel of some small enterprises still have some misunderstandings about the collection of R&D expenses due to their lack of professional knowledge. In addition, accounting and tax law for the deduction of the standard is not consistent, whether the financial personnel in the enterprise can distinguish correctly and other problems, also caused a certain difficulty to the collection of expenses.

4.3 There are limitations of tax incentives from multiple perspectives

4.3.1 Regional limitations

There are differences in the implementation of fiscal and tax preferential policies in different regions, resulting in an imbalance in the innovative development of energy conservation and emission reduction among regions. China is geographically broad, and the economic development level, industrial structure and environmental pressure of different regions are different. However, there are obvious regional differences in the implementation of the current preferential fiscal and tax policies on innovative technologies for energy conservation and emission reduction. For the developed eastern regions, due to their good economic foundation and strong ability to accept and apply innovative technologies, the corresponding preferential fiscal and tax policies may be larger; In the western underdeveloped regions, despite their urgent demand for energy saving and emission reduction technologies and significant potential benefits, the actual preferential fiscal and tax support may be relatively small. Fiscal and tax incentive policies have a significant positive promoting effect on the green technology innovation of photovoltaic enterprises in eastern and central China, while government subsidies have a negative but not significant effect on the green technology innovation of photovoltaic enterprises in western China. This regional difference leads to the imbalance of energy conservation and emission reduction innovation development among regions, which is not conducive to the overall promotion of energy conservation and emission reduction work nationwide.

4.3.2 Industry limitations

The current preferential tax policies do have obvious industry-oriented characteristics and are more inclined to specific industries such as clean energy manufacturing (such as photovoltaic industry), new energy vehicles, high-tech, photovoltaic, integrated circuits, advanced technology service industries, environmental protection, energy saving and water saving projects, which undoubtedly plays a positive role in promoting green technology innovation in these industries. For example, in the manufacturing photovoltaic industry, tax incentives provided by reducing tax rates, accelerating depreciation, additional deduction of research and development expenses, etc., have strongly stimulated the R&D investment and technological upgrading of enterprises, and promoted the rapid development of the entire industry and the improvement of emission reduction effect. However, this kind of targeted preferential policies in the non-manufacturing field, especially those who also shoulder the responsibility of energy conservation and emission reduction in the coverage of the enterprise is not sufficient. Non-manufacturing photovoltaic enterprises and other industries, such as building energy-saving transformation, industrial process optimization, agricultural water-saving irrigation, waste resource utilization and other fields, although they also play an important role in the overall energy conservation and emission reduction work, but due to the current preferential tax policies to their green technology innovation support is limited or insufficient applicability, Therefore, they fail to give full play to the potential energy saving and emission reduction efficiency of these industries.

4.3.3 Limited scale

At present, many preferential fiscal and tax policies have largely focused on large enterprises and their major energy conservation and emission reduction projects. Such enterprises have significant advantages in resources, technology and market influence. Policy support will help them rapidly expand the application scale of green technology innovation and have a positive impact on energy conservation and emission reduction of the whole society. However, at the same time, the attention and support for small and medium-sized enterprises in the process of policy design and implementation is relatively weak. Due to their small scale and limited capital strength, smes

have great vitality and potential in energy conservation and emission reduction technological innovation. They are not only more flexible in technology research and development and product innovation, but also can play a unique role in market segmentation and solving local environmental problems. However, the existing fiscal and tax preferential policies are not enough to reduce the cost burden of small and medium-sized enterprises in green technology research and development, equipment purchase, demonstration project promotion, etc., and it is difficult to fully mobilize the enthusiasm and initiative of small and medium-sized enterprises to participate in energy conservation and emission reduction innovation.

4.3.4 Limitation of the target

Current preferential tax policies mainly target state-owned enterprises and non-state-owned enterprises and fail to fully consider the needs and development of other innovative entities, such as scientific research institutions and individual innovators. In practice, due to the special status and policy inertia of state-owned business, the implementation of preferential tax policies tends to favor state-owned business, while non-state-owned business is relatively difficult to enjoy the same preferential treatment. However, in terms of the stimulus degree of fiscal and tax policies to stimulate technological innovation, the stimulus effect of non-state-owned enterprises is more significant. In the photovoltaic industry, a typical field of green technology, the study found that the existing fiscal and tax incentive policies did not significantly stimulate the green technology innovation of state-owned enterprises but had a significant positive effect on the green technology innovation of non-state-owned enterprises. The reasons are as follows:

First, the green industry, as an industry highly dependent on knowledge, technology and capital, has a more competitive market environment for non-state-owned enterprises. In this environment, non-state-owned enterprises must rely on strong core competitiveness to survive and develop. Therefore, they are more deeply aware that green technology innovation is the key to enhance the competitive advantage of enterprises and ensure sustainable development, so they are more willing to invest in and actively promote green technology innovation. Secondly, non-state-owned enterprises usually face more serious financing problems, which limits their ability to invest in green technology innovation. The government's fiscal and tax incentive policies have just eased the pressure on non-state-owned enterprises at the capital level, improved their cash flow through subsidies and tax incentives, reduced financial risks in the process of technological innovation, and enabled non-state-owned enterprises to cope with the massive investment required for transformation and upgrading.

Moreover, the signal transmission effect of fiscal and tax incentive policies on non-state-owned enterprises is particularly prominent. Market participants generally believe that non-state-owned enterprises receiving government subsidies mean that they have higher development potential and stronger innovation ability, which not only enhances the confidence of non-state-owned enterprises themselves, but also attracts more attention and support from external investors, thus improving the overall performance of non-state-owned enterprises in green technology innovation.

4.4 Insufficient support for innovative talents from fiscal and taxation policies

The lack of preferential policies for innovative talents is a problem worthy of attention in the current fiscal and tax support policies. In the process of promoting the development of innovative technologies for energy conservation and emission reduction, talent is a crucial factor. However, there are still some inadequacies in the current preferential fiscal and tax policies to support innovative talents, which restricts the development and role of innovative talents to a certain extent.

4.4.1 Limitations of the existing preferential policies for talents

At present, China's talent preferential policies in the field of energy conservation and emission reduction innovative technology research and development mainly focus on tax relief and research project funding, etc. These measures have stimulated the innovation vitality of talents to a certain extent. However, these policies also have some limitations, mainly reflected in the following aspects: First, the coverage of the policy is not extensive enough. The current preferential tax policies are mainly aimed at specific high-tech enterprises and scientific research institutions, while there is insufficient support for innovative talents in other fields and industries. Second,

the policies are not attractive enough for high-end talents. Although tax breaks and other measures can reduce the cost of enterprises, for high-end talents, they are more concerned about the benefits of career development, salary and other aspects. Therefore, the government needs to formulate more comprehensive preferential policies for talents to meet the needs of talents at different levels and in different fields. Finally, the role of policies in stimulating the vitality of talent innovation is limited. The current preferential tax policies are more about rewarding the innovation results that have been achieved and lack incentives for the innovation process.

4.4.2 The incentive mechanism design is not perfect

Policy design is the key factor affecting the implementation effect of preferential policies. If the policy design is not reasonable, no matter how much money and resources are invested, the expected effect cannot be achieved. Therefore, policy design needs to fully consider the characteristics and needs of innovative talents to ensure targeted and effective policies. There may be some imprecision in the design of incentive policies for innovative talents. For example, the matching degree between the reward standard and the actual contribution is not high, which cannot effectively stimulate the R&D enthusiasm and innovation potential of individuals or teams. In addition, the lack of differentiated support policies for different levels and types of innovative talents may lead to the loss of some key talents or the failure to give full play to innovation capabilities.

4.4.3 Talent training and introduction mechanisms lag behind

At present, there is a mismatch between China's talent training and introduction mechanism in the field of energy-saving and emission-reduction innovative technologies and fiscal and tax policies. First, there are relatively few preferential fiscal and tax policies for the research and application of energy-saving and emission-reduction technologies, which fail to effectively encourage personnel training and industry-university-research cooperation. Secondly, there is a lack of tax incentives for overseas high-level talents returning to China to engage in research and development and innovation of energy-saving and emission reduction technologies, which restricts the introduction of international advanced technologies to some extent. In addition, the existing fiscal and tax policies are not systematic and synergic in supporting industry-university-research cooperation and promoting technology transformation and personnel training and have failed to form an effective mechanism for personnel training and introduction.

4.4.4 Issues of policy implementation and enforcement

The existing preferential policies for innovative talents may have problems in practical operation such as difficulty in landing and inadequate implementation. For example, complicated approval process and information asymmetry lead to low awareness of the policies, which makes many preferential measures unable to truly benefit innovative talents. At present, the preferential policies for innovative talents may mainly focus on some specific fields or links, without forming a complete support system, and the policies remain in the theoretical stage and cannot be implemented. For example, there may be gaps or deficiencies in support for talent training, research and development funding, and results transformation, which may lead to policy bottlenecks in the process of development of innovative talents.

4.4.5 Insufficient financial support

In the preferential policies for innovative talents, apart from non-material support, such as training and project participation opportunities, financial support is also a crucial part. However, in practice, the problem of insufficient financial support often appears, which mainly stems from the limited financial budget and the uneven distribution of funds. Due to financial budget constraints, the government or enterprises may face a shortage of funds when supporting innovative talents. Limited funds make it difficult to provide all-round support for innovative talents, especially in research and development, project implementation and other aspects that require a lot of capital investment. This not only affects the development of individual innovative talents, but also restricts the innovation activities of the entire industry or region. In addition to budget constraints, the uneven distribution of funds is also an important reason for insufficient financial support. In some cases, funds may be allocated to projects or

individuals that do not have the greatest potential due to the lack of effective evaluation and screening mechanisms. This not only leads to a waste of resources, but may also produce the "Matthew effect", a phenomenon where the strong get stronger and the weak get weaker, further exacerbating the imbalance in financial support.

5. Suggestions on improving fiscal and tax preferential policies to promote technological innovation in energy conservation and emission reduction

5.1 Continue to optimize preferential tax policies and further promote "true innovation" in enterprises

Preferential tax policies can help improve the enthusiasm of enterprises for technological innovation, significantly improve the efficiency of enterprises' innovation output, and help enterprises' substantive innovation. The goal of relevant government departments to formulate and implement preferential tax policies is to stimulate the innovation enthusiasm of enterprises, help enterprises to innovate, and improve the market competitiveness of enterprises. However, many government departments do not find the right direction when formulating tax policies and take the number of enterprises benefiting from tax preferential policies as the assessment target, rarely considering the economic effects generated by tax preferential policies. The government should change its ideology, take whether the enterprise has implemented substantive innovation as the assessment objective, pay attention to the implementation benefits of the policy, and pay attention to the quality inspection of the enterprise's substantive innovation.

The relevant government departments should do a good job of comprehensive research before formulating the relevant system and policy of tax preferential policies. Government departments should strengthen supervision, establish and improve the evaluation mechanism of innovation achievements, assess the innovation benefits of enterprises, and inspect the technological innovation achievements of enterprises. After examining the actual development of domestic enterprises and the effective preferential tax policies identified by foreign enterprises involved in innovation of scientific and technological achievements, the draft shall be put forward to the National People's Congress and approved by the National People's Congress to form special tax laws and regulations. In the laws and regulations, it is necessary to strictly define the conditions, implementation methods, management rules and preferential scope of tax incentives for each manufacturing enterprise, specify the conditions for the identification of enterprise innovation, reasonably define strategic innovation and substantive innovation results, and provide more clear and different tax incentives for the two types of innovation of enterprises. Continue to refine the identification standards for tax incentives, to specific problem specific analysis, according to the different innovation results of enterprises, to give enterprises different tax incentives.

In the process of the implementation of tax laws and regulations, relevant government departments should perform their supervisory functions well, and various departments should supervise each other to ensure that the responsibility goes to the people and the power is locked into the cage of the system. Clearly define strategic innovative enterprises and substantive innovative enterprises, in the process of qualification examination of preferential tax policies, we should pay attention to the results of innovation output, strictly examine and approve the scientific and technological innovation achievements submitted by enterprises, and judge whether they match the national identification standards. Reasonable determination of strategic innovation results and substantive innovation results, for some attempts to use strategic innovation to defraud the state preferential tax subsidies enterprises to be severely cracked down on, ordered to correct; The majority of enterprises should constantly understand the various preferential tax policies issued by the state, pay special attention to the country's definition of substantive innovation results and strategic innovation results standards, and combine their own innovation results, carefully check whether it matches the national identification standards. Enterprises should declare their innovation achievements in strict accordance with the relevant national systems and refuse to use strategic innovation achievements to defraud the state's preferential tax policies.

The government should establish an evaluation system for the effect of fiscal and tax preferential support and conduct dynamic supervision of the special financial funds of enterprises involving tax preferential policies through the Internet, big data and artificial intelligence. In addition, the government will classify the fiscal expenditures involving tax incentives according to regions and industry categories, seek truth from facts,

constantly adjust the direction of tax incentives support, and improve the efficiency of the government's use of fiscal funds involving substantive innovation.

5.2 Lowering the threshold of preferential fiscal and tax policies to solve the problem of expense collection

Although the preferential tax policies are universal, the positive benefits brought by them are minimal for some start-up small and medium-sized technology-based enterprises. Many start-up science and technology enterprises are small in scale at the beginning of their establishment, with fewer patents and little eligibility for tax incentives, and are often rejected by a series of good policies. The development of small and medium-sized technology enterprises in their infancy cannot be separated from financial support. Therefore, the universality of the preferential tax policies is still lacking, and the preferential tax policies are often unitary. Therefore, for small and medium-sized enterprises of science and technology in different industries, specific problems should be analyzed. While grasping the universality of science and technology enterprises, it is not possible to ignore the differences between different industries, grasp its particularity and diversity, and use scientific and flexible tax preferential policies to help the development of enterprises.

In the actual financial business accounting process of many enterprises, because the accounting system implemented by the enterprises is not perfect, at the same time, the financial staff of the enterprises have not established a special "research and development expenditure" project to reasonably collect the research and development expenses of the enterprises, which leads to the phenomenon of incorrect and disorderly recording of research and development expenses. At the same time, enterprises cannot reasonably divide research and development expenses and production and operating expenses, which leads to enterprises to bear more tax risks. Enterprises should constantly improve the system of additional deduction of research and development expenses, carry out feasibility analysis of research and development projects, reasonably define the process and technology of research and development projects, and set up projects that meet the requirements. For R & D expenses accounting to implement the responsibility system, for each project to establish a financial accounting working group, accounting timeliness throughout the whole process of the project, the whole process of follow-up R & D projects, timely statistics of project consumption costs, accurate development of R & D expenses list. At the same time, the enterprise should also establish and improve the research and development expenses related to the system supervision system, in-depth supervision of the implementation of research and development projects of the standard degree, the enterprise should constantly improve the expenditure of research and development expenses, according to the financial accounting system, set up the corresponding accounting accounts for research expenses.

5.3 Increase tax incentives and ease the financing constraints of enterprises

In the current complex international economic situation, the competition between enterprises is becoming increasingly fierce, and enterprises should constantly improve the quality and quantity of innovation to ensure that they can win the first place in the brutal market competition. The technological innovation of enterprises is inseparable from the strong support of the government. A series of preferential tax policies of the government can help enterprises improve their innovation ability and accelerate the research and development of core technologies. By increasing tax incentives, enterprises can solve their financing dilemma and break through financing constraints. Because the current preferential tax policies play a promoting role in easing the financing constraints of enterprises, the following policy suggestions are put forward:

The government should continuously optimize tax reduction and fee reduction policies, reduce the tax burden of enterprises, and help enterprises achieve technological breakthroughs in innovation. China's private enterprises are faced with the problem of fewer tax incentives, private enterprises have tax incentives mainly include goods and labor tax threshold concessions, corporate income tax incentives, etc., and these relatively single policy support can be described as a drop in the water for private enterprises, and the incentive effect for private enterprises is weak. In this regard, the relevant government departments of our country need to increase the preferential tax support for private enterprises and change the relatively single problem of tax incentives. Government departments can adjust the policy of accelerated depreciation of fixed assets of private enterprises, the government can appropriately relax the restrictions on accelerated depreciation of fixed assets, increase the deductible amount of

tax, which can further increase the available funds of enterprises and help enterprises have more funds to invest in production and research and development. All in all, the government needs to use various fiscal methods to help small, medium and micro enterprises solve the financing problem, and continuously reduce taxes and fees to help private enterprises get rid of the shortage of research and development funds. As for state-owned enterprises, they have more sufficient technology research and development funds compared with private enterprises. Therefore, relevant departments of the Chinese government should strengthen the supervision of the use of subsidy funds for state-owned enterprises, reasonably evaluate the project performance of state-owned enterprises, and improve the utilization efficiency of funds.

5.4 Improve the individual income tax policy to encourage innovation of scientific and technological talents

Talents are the source and driving force for enterprises to promote scientific and technological innovation. We should increase support and subsidies for scientific and technological innovation talents, constantly improve the income distribution system related to the transformation of scientific and technological achievements and increase tax incentives for scientific and technological innovation talents. At present, there is a real problem of talent shortage in many fields in China, such as information technology industry, medical and health industry, new energy and environmental protection industry, Internet finance and manufacturing industry. In view of this problem, the government departments should pay more attention to it and solve the problem of talent shortage in various fields.

The government departments should consider the income problem of innovative talents, and constantly adjust and improve the individual income tax policy of talent equity incentive. To retain scientific and technologically innovative talents in enterprises, China can allow high-tech enterprises to implement the policy of tax deferral. Relevant government departments should clearly define the applicable conditions for tax deferral. One of the conditions for tax deferral is the expiration of 5 years from the date when employees hold equity. The enterprise may issue a certain share of the company to the scientific and technological innovation talents as an incentive, and stipulate that the tax time of the share is when the scientific and technological talents transfer the stock, and shall be calculated according to the difference of the stock transfer income less the cost of acquiring the stock, and shall be calculated according to the tax rate of 20% of the property transfer income.

For some industries that are in short supply of talents, the government departments may introduce a series of preferential tax policies. For example, when collecting individual income tax, the innovative talents will be subsidized by the government for the part of individual income tax exceeding 20%; In the process of transforming scientific and technological achievements, the relevant research team of the enterprise can give talents equity rewards in the form of equity distribution, and the equity rewards obtained by scientific and technological talents can be exempted from individual income tax; In the enterprise, if the scientific research talents have outstanding innovation achievements, the company may distribute cash rewards. For the cash rewards obtained by the scientific research talents, the tax department may levy individual income tax at a special rate of 10%.

Through continuous improvement of the individual income tax equity incentive policy, the scientific and technological talents and the company's equity interests are tightly tied together, improve the enthusiasm of scientific and technological innovation talents, help enterprises stabilize talents, obtain the source of innovation, promote the innovation of enterprise products and manufacturing process, help enterprises grow and accelerate the progress and development of society.

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Entrepreneurial Characteristics, Education, and Intention: Does Sustainability Orientation Matter?

Md. Solaiman Chowdhury¹, Md. Mehedi Hasan², Iqbal Hossain Moral³, Syed Muhammad Ali Reza⁴,
Md Shahinur Rahman⁵, Md. Enamul Haque⁶

¹ Associate Professor, Department of Management Studies, University of Rajshahi, Rajshahi, Bangladesh. Email: schowdhury@ru.ac.bd

² Associate Professor, Human Resource Management Discipline, Khulna University, Khulna, Bangladesh. Email: mehedihasan@ku.ac.bd

³ Senior Lecturer, Department of Business Administration, Northern University of Business and Technology Khulna, Khulna, Bangladesh. Email: iqbalmt@gmail.com

⁴ Professor, Department of Management Studies, University of Rajshahi, Rajshahi, Bangladesh. Email: syedreza@ru.ac.bd

⁵ Department of Business Administration, Northern University of Business and Technology Khulna, Khulna 9100, Bangladesh. Email: srahman.bu367@gmail.com

⁶ Assistant Professor, Department of Management, Bangamata Sheikh Fojilatunnesa Mujib Science & Technology, Jamalpur, Bangladesh. Email: enamul.bd.mit@gmail.com

Correspondence: Md. Solaiman Chowdhury. E-mail: schowdhury@ru.ac.bd

Abstract

Entrepreneurship education plays a pivotal role in equipping individuals with the skills and mindset needed for entrepreneurial endeavors. This study investigates how entrepreneurial attributes and entrepreneurship education affect business students' inclinations to become entrepreneurs. It focuses on how entrepreneurial education has affected business graduates' ambitions in Bangladesh, using entrepreneurial characteristics and education as predictive variables. Data was collected from 410 respondents across public, and private universities in Bangladesh, employing a conclusive research approach with purposive sampling. AMOS-SEM was employed to analyze entrepreneurial intentions, while preliminary analyses were conducted using SPSS to address various factors. The results highlight the complexity of entrepreneurial intention, revealing that it is significantly affected by two key traits (innovativeness and self-confidence) and entrepreneurship education. Notably, the study uncovers a strong moderating influence of sustainability orientation on the association between entrepreneurial intention, entrepreneurship education, and innovativeness. The study also emphasizes the importance of the connection between entrepreneurial drive in Bangladesh and the need for autonomy and achievement. However, the study found autonomy has little to no impact on Bangladeshi business graduates' preferences to become entrepreneurs, and the need for achievement does not significantly affect their intentions. This study has meaningful implications for both academia and practical entrepreneurship endeavors. This research investigates the moderating effects of sustainability orientation on entrepreneurial education and traits, highlighting the significance of these elements in the particular context of Bangladeshi business graduates.

Keywords: Entrepreneurial Characteristics, Education, Intention, Sustainability Orientation, TPB

1. Introduction

Youth is a valuable resource in any country because of their contribution to economic and social development. They are also the driving force for the national advancement of any country (Aharonovich, 2019). In Bangladesh, significant portions of youth are graduate and postgraduate students. According to the annual report of the University Grants Commission (UGC), there were approximately 4.7 million undergraduate and postgraduate students in 50 public and 107 private universities in 2020 (Rahman et al. 2022). This remarkable working force is expected to engage in different productive activities while completing their studies. Many scholars such as Honeyman (2020) assert that the active participation of the young generation benefits economic activities. However, Rahman et al. (2022) noted that a skilled young population is an asset for any nation if they are used in various productive operations such as production, operation, financing, management, and marketing. The context might be different if the majority of this large segment remains unemployed, which can threaten a nation's social, economic, and political stability (De Guzman et al., 2020). This is because youth unemployment can lead to demoralisation human capital depreciation, and social exclusion (Vogel, 2015). These unemployed graduates may gradually lose skills and increasingly suffer mental frustration or social alienation (Uju & Racheal, 2018), which is also connected to family instability. In addition, it affects psychologically and has a long-term impact that can increase the risk of future unemployment or wage penalties (Bell & Blanchflower, 2019).

Every year, thousands of students obtain their bachelor's and master's degrees from universities. Most of these students enter the job market, but a significant number remain unemployed. As a result, the graduate unemployment situation in Bangladesh is an alarming concern. For instance, the unemployment rate among university graduates is reported to be higher than that among high school graduates (Rashid & Islam, 2020). In such cases, the development of entrepreneurial endeavours can be a viable economic activity. Entrepreneurial activity benefits society in numerous ways, such as the creation of jobs, enhancement of productivity, reorganization and diversification of the economy, and reduction of market inefficiencies through the creation of a more dynamic and competitive marketplace (Lyons & Zhang, 2018).

Entrepreneurship education is also crucial for unemployment alleviation to foster an aspiration to become a successful business owner. Anyone interested in starting a business can benefit from formal entrepreneurship education (Nowiński et al., 2019). Thus, a pressing need exists for universities to teach students entrepreneurial skills (e.g., how to identify and support start-ups). In most cases, Bangladesh relies on the natural supply of entrepreneurial talent. To address the role of entrepreneurship on students' attitudes and knowledge, Ajose (2021) asserts that entrepreneurship knowledge directly affects their plans to start businesses. Researchers believe that entrepreneurship learning can be provided through education and training to develop entrepreneurial intentions among students (Westhead & Solesvik, 2016). Earlier studies have identified that people with entrepreneurship education and training are also greater likelihood to launch a business than those who do not (Gielnik et al., 2019). Numerous models and theories, including Shapero's Entrepreneurial Event Model (SEE) (Shapero & Sokol, 1982), Ajzen's Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Theory of Planned Behaviour Entrepreneurial Model (TPBEM) (Krueger & Carsrud, 1993), and the Social Cognitive Career Theory (SCCT) (Lent et al., 1994), have extensively studied entrepreneurial intention. Nevertheless, few of these studies have focussed on the cross-border context in which entrepreneurial intention is influenced (Giacomin et al., 2011). Prior studies tended to focus on developed countries and comparisons between developed and developing countries (Rahman et al., 2022), while empirical evidence from a least developed country was lacking. According to Nabi and Holden (2008) and Ramalho et al. (2022), cross-cultural study is essential to understanding the connection between entrepreneurship and behaviour of individuals and culture. Furthermore, Mehta et al. (2022) found a sizable research gap in the entrepreneurial skills of nursing university students with regard to sustainable development.

Therefore, many researchers, scholars, and academicians have asserted the importance of entrepreneurship and its role in sustainable development. However, very few studies, related to sustainable orientation and entrepreneurship have been initiated in the context of least-developed countries. In addition, the nexus between students' entrepreneurial characteristics and entrepreneurship education and their entrepreneurial intentions is still less explored the global context. In order to address these gaps, the present study examines the entrepreneurial characteristics and education of business students in Bangladesh. The objective of the study is to examine the

influence of entrepreneurial traits (such as inventiveness, self-confidence, need for achievement, and autonomy) and entrepreneurship education on graduates' intent to become entrepreneurs, with a focus on the contribution of sustainable orientation. In addition, the goal of this study is to provide in-depth insights and understanding for policymakers and researchers on university students' entrepreneurial endeavours to identify future business start-ups.

2. Theoretical Underpinning

The study makes use of the Theory of Planned behaviour (TPB), a well-known conceptual framework for understanding human behaviour. In research like those by Ramadani et al. (2022), it has previously been demonstrated that entrepreneurial intention is a reliable predictor of entrepreneurial behaviour. The Theory of Planned Behaviour (TPB), which has been used to examine both organisational and individual behaviour, was built upon the Theory of Reasoned Action (TRA), which Icek Ajzen refined in 1991. Additionally, TPB components were adjusted to examine entrepreneurial behavioural intention using the Shapero and Sokol-developed entrepreneurial event model, which was first used in 1982. It is used by researchers in several disciplines, like as business and psychology, to analyse behavioural patterns in people. Several intention-based models have been utilised by researchers in the field of entrepreneurial research to examine entrepreneurship activities, and the findings indicate a strong justification for doing so. Due to this, a lot of academics have thought about using the TPB model to study entrepreneurial actions and goals (Schlaegel & Koenig, 2014). Important factors that affect how people behave in companies, such as individual attitudes, subjective standards, and perceived behavioural control, are all taken into consideration by the TPB model. Explanatory intention (EI) theory has frequently been used to explain entrepreneurial intention in earlier studies (Van-Gelderen et al., 2008). This approach successfully explains how environmental and human variables interact (Sivarajah & Achchuthan, 2013). The antecedents of this theory, such as entrepreneurial intention, individual attitudes, subjective standards, and perceived behavioural control, have an impact on individual behaviour. Moreover, it is necessary to forecast how much effort a person will put into the activity. People are more likely to engage when they strongly desire to participate in a particular activity.

2.1 Hypothesis Development

Innovativeness

The ability of a business to actively engage in and promote new ideas, inventive thinking, research, and experimentation directed towards new products, systems, or technical advancements is known as innovativeness (Lumpkin & Dess, 1996). Entrepreneurship and innovation are connected because innovation is an essential element for entrepreneurs and is vital to the entrepreneurial process (Melati et al., 2018). Innovation's primary goals include the development of novel consumer items, essential services, and inventive systems and processes. Entrepreneurs use innovation to find answers, address ongoing issues, and create new goods or services (Melati et al., 2018). It would be interesting to explore the relationship between innovativeness and entrepreneurial intention. Thus, we postulate that;

H1. Innovativeness positively influences university students' entrepreneurial intentions.

Self-Confidence

According to Wilson et al. (2007), self-confidence is a person's view of their capabilities and skills. It further influences how they perceive themselves as achieving their goals (Kasouf et al., 2015). As it reflects their belief that it is possible to accomplish this, even when the course of action may be dangerous for others, self-confidence in entrepreneurial situations implies that it can predict people's ability to create new enterprises (Piperopoulos & Dimov, 2015). Setting and achieving more difficult goals is easier for an entrepreneurial person who has self-confidence. Taking into account this general notion, a self-confident entrepreneur is a person who prefers to develop his or her businesses. Therefore, self-confidence is a crucial characteristic among entrepreneurs, especially

those who have just started, and is therefore thought to be one of the determining factors of entrepreneurship (Arenius & Minniti, 2005). Therefore, we formulate the hypothesis

H2. Self-confidence positively influences university students' entrepreneurial intentions.

The need for achievement

An individual's ambition and quest to accomplish major tasks or objectives are the need for achievement. People with a great desire for success are highly self-motivated because of their strong desire for success. Barba-Sanchez and Atienza-Sahuquillo (2017) found that an entrepreneur's motivation for starting a business depends on his or her ability and desire to do so. Entrepreneurs driven to succeed are more likely to set up new businesses. According to Staniewski and Awruk (2015), entrepreneurs' ambition to own enterprises is influenced by their drive for self-realization and self-satisfaction. Additionally, Barba-Sanchez and Atienza-Sahuquillo (2017), have shown that engineering students' desire to succeed is a significant factor in their decision to establish their businesses. Thus, students' entrepreneurial aspirations are influenced by their desire to succeed. Moreover, Koh (1996) points out that the desire for accomplishment is the most well-known psychological attribute associated with entrepreneurship. This personality trait has been shown to strongly correlate with entrepreneurial intention (Karimi et al., 2015). Therefore, the following can be hypothesized;

H3. The need for achievement positively influences university students' entrepreneurial intentions.

Autonomy

According to Douglas and Shepherd (2000), a positive attitude towards autonomy includes the preference to enjoy independence and vice versa. However, people with a high level of independence experience relatively low marginal disutility from more autonomy in decision making. People with more positive attitudes towards autonomy and a greater preference for decision-making autonomy are expected to spend more time searching for self-employment opportunities. As a result, entrepreneurial intentions and self-determination that may be intrinsic or extrinsic are the driving forces behind human action (Bilal et al., 2021). Autonomous or self-motivation includes intrinsic and some forms of extrinsic motivation. Research has demonstrated that self-employed persons have greater control over their lives than those who work in traditional jobs (Schneck, 2014). As a result, entrepreneurship is likely a career choice for those who want autonomy or independence. Therefore, the above context supports to hypothesise that:

H4. Autonomy in the workplace positively influences university students' entrepreneurial intentions.

Entrepreneurship education

Entrepreneurship development is essential for the economic development of any country and is considered the outcome of current business education. This argument is much more vital for future generations since they will be the corporate leaders of the future and the driving force of economic progress (Bilal et al., 2021). In a substantial number of studies, scholars have affirmed that human resource development depends primarily on education and training (Ravindran & Iyer, 2014). From that cornerstone, it is possible to impart useful knowledge on starting new businesses through effective entrepreneurship education. According to this point of view, Wang et al. (2022) contend that education in entrepreneurship may inspire individuals to seek entrepreneurial professions. According to Uddin et al. (2022), students who take part in academic entrepreneurship programmes have a higher likelihood of starting their own businesses in the future. For instance, 124 scientific and engineering students participating in entrepreneurial programmes at British and French institutions were surveyed by Souitaris et al. in 2007. They discovered that the programmes strengthened students' propensities for entrepreneurship. In a separate study, Kolvereid and Moen (1997) found that graduates of a Norwegian business school with an entrepreneurship degree were more likely to start their businesses than those with other majors. Consequently, students who graduate from entrepreneurship programmes may have the drive, skills, and information necessary to start their own businesses

(Astiana et al., 2022; Duong, 2022). Hence, entrepreneurial education has been seen to substantially impact entrepreneurial intention. Thus, it can be postulated that;

H5. Entrepreneurial education positively influences university students' entrepreneurial intentions.

Moderation of the Sustainability Orientation

Entrepreneurship for sustainable development carries an emerging promise that people may seek entrepreneurial opportunities due to market inefficiencies to reap the rewards of entrepreneurship. Entrepreneurially-minded people may explore possibilities they anticipate to avail a greater outcome. Nowadays, a question has been raised about whether market defects may lead to equal or more significant potential for entrepreneurial success (Barbosa et al., 2022). In such cases, market inefficiencies exist when marketers merely focus on profitable investment possibilities with better returns instead of long-term consequences (Sanstad & Howarth, 1994). For instance, saving energy can be a potential opportunity that would not likely attract the attention of someone solely concerned with maximising economic cost. Nevertheless, a potential entrepreneur who is more concerned with sustainability may be interested in opportunities with more significant sustainability benefits rather than depending on profitability.

At the beginning stage, the characteristic approach was an early solution to determine what elements influence entrepreneurial intention. In other words, entrepreneurial goals and activity are attributed to their personality, and self-efficacy, risk-taking inclination, or optimism are considered influential personal factors (Mitchell et al., 2002). According to Robinson et al. (1991), a person's personality appears to be too reductionist because entrepreneurial activities occur in different circumstances and in close contact with other people and the environment. The TPB model (Ajzen, 1991) has influenced many subsequent models that have examined entrepreneurial intentions by including contextual elements (Krueger et al., 2000). According to L uthje and Franke (2003), these elements should be separated into perceived barriers to and support for entrepreneurship about entrepreneurial education. However, to better understand attitudes towards behaviour in relation to sustainable enterprise, it is necessary to include the sustainability orientation of the individual as an additional variable. Recent studies on students' entrepreneurial intentions have recently attracted the attention of entrepreneurship researchers (Ajzen & Fishbein, 1977; Souitaris et al., 2007), and sustainability orientation is predicted to have a substantial moderating impact on the antecedents of students' attitudes, subjective norms, and behavioural control. Based on the considerations mentioned above, we can formulate the following hypotheses:

H6: A strong sustainability orientation enhances the connection between innovativeness and entrepreneurial intention.

H7: A strong sustainability orientation enhances the connection between self-confidence and entrepreneurial intention.

H8: A strong sustainability orientation enhances the connection between the need for achievement and entrepreneurial intention.

H9: A strong sustainability orientation enhances the connection between autonomy and entrepreneurial intention.

H10: A strong sustainability orientation enhances the connection between entrepreneurship education and entrepreneurial intention.

Figure 1 represents the conceptual framework of this study.

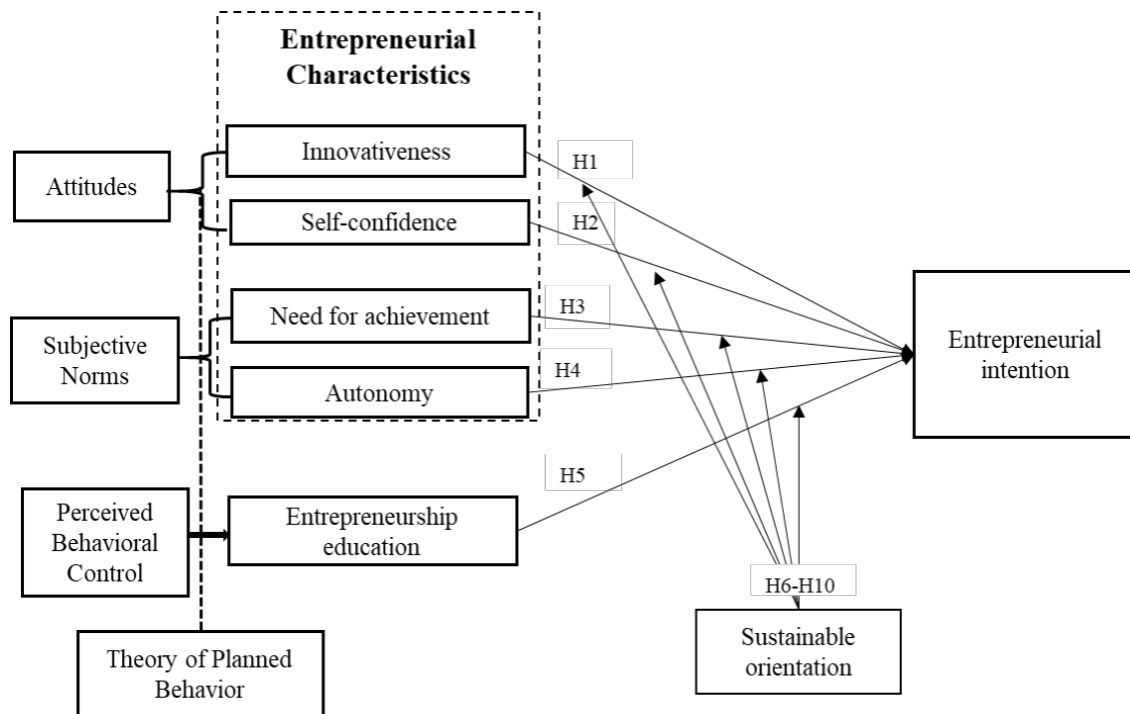


Figure 1: Conceptual model of the study

3. Methodology

3.1 Research Design

This study used a conclusive research design (Neelankavil, 2015) specifically designed to test the hypothesis. The main benefit of such a research design is that it is the only reliable method for proving that altering one item has a discernible effect elsewhere (Erickson, 2017). This approach yields reliable results when executed correctly.

3.2 Sample Size and Sampling Technique

The study applied purposive and convenience sampling techniques to select respondents for the study. To gain a deeper perspective and expertise of a particular setting, we purposefully chose business graduates rather than students from other disciplines. The main objective of purposive sampling is to ensure that the sample is more adequately related to the aim of the research (Yang et al., 2020). We used a convenient sample strategy because of time restrictions (Etikan et al., 2016). In the initial phase of this study, 20 students from public and 15 from private universities were interviewed to determine the feasibility of the questionnaire. However, the study employed Slovin's method to determine the sample size because the large population size and students' behavioral intentions are unknown (Pai-Rajesh & Alathur, 2019).

$$n = \frac{N}{1 + Ne^2}$$

Where,

n= denotes the sample size.

N= corresponds to the total population under consideration.

e =signifies the researcher-determined marginal error, which, in this case, has been set at 5%.

3.3 Target Population

Students at universities in Bangladesh made up the study's target population. More specifically, students studying in different business disciplines at private and public universities were considered as the target population of this study. In Bangladesh, many university graduates join various job sectors during or after their studies. Although the employment rate among university students is high, a substantial number of students in Bangladesh are not interested in starting ventures due to several obstacles, including lack of entrepreneurial knowledge and skill, lack of capital, lack of managerial skill, and lack of social acceptability. To determine these university students' entrepreneurial intentions, this research gathered data from a targeted population across the country.

3.4 Instrument Development

The primary data of this study were collected using a quantitative survey technique. All constructs were assessed using a Likert scale with a maximum of five points (Strongly disagree to strongly agree is indicated by a 1 to 5).

Innovativeness: five measuring items were used to assess inventiveness, which was (a) "I think innovation is important to me," (b) "I think innovation can improve the effectiveness of my study," (c) "I think that I am the most creative student compared to my mates," (d) "I like to experiment with new ideas," and (e) "I seek out new ways to do things." Measurement items of innovativeness were adapted from Mueller and Thomas (2001).

Self-confidence: According to Gelaidan and Abdullateef (2017), self-confidence is a human emotion that refers to trust in one's abilities, talents, and judgement. The research by Turker and Sonmez Selçuk (2009), which examined students' real levels of self-confidence and their capacity to manage future business endeavours, is used to investigate five components of self-confidence.

Need for achievement: An entrepreneur's motivation for starting a business depends on the ability and desire to act accordingly (Barba-Sanchez & Atienza-Sahuquillo, 2017). In doing so, entrepreneurs' ambition to own enterprises is influenced by self-realization and self-satisfaction (Staniewski & Awruk (2015). Five questions taken from Lai et al. (2010) were used to assess the need for achievement.

Autonomy: According to Lumpkin and Dess (1996), autonomy is constrained by ownership rights and may vary depending on the degree of centralisation or delegation. This could be related to the size of the organisation. A total of 5 items were adapted to examine autonomy; all were selected from Al Mamun et al. (2017)

Entrepreneurship education: Eight measurement items were adapted from Duong et al. (2022) and Maziriri et al. (2022) to determine entrepreneurship education. Measurement items include course outline, lecture delivery, teaching approach, and lecture notes.

Entrepreneurial intention: Entrepreneurial intention determines how people become interested in starting their business. A total of 8 items representing actual intention (e.g., I intend to set up a company in the future) and self-prediction (e.g., "My professional goal is to become an entrepreneur") were utilised by Chen et al. (1998) and Tounès and Fayolle (2006), who used a multi-component measure to isolate the individual components that influence entrepreneurial intent.

Sustainability orientation: Measurement items to examine sustainability orientation were adapted from Kuckertz and Wagner (2010) and Tounès and Fayolle (2006). who used sustainable orientation to describe entrepreneurship as a whole. For example, students calculated the amount of time and effort it would take to contribute significantly to society's sustainability. Students were categorised into low and high groups based on a median split of their sustainability orientation to examine the moderating effects on the relationship among innovativeness, self-confidence, autonomy, need for achievement, entrepreneurship education, and entrepreneurial intention. To avoid wasting time and resources, the direct influence of sustainability orientation on entrepreneurial intention was ignored.

3.5 Data collection

This study employed a self-administered questionnaire to gather information from an individual survey. Before proceeding with the final data collection, the questionnaire was reviewed by four industry experts. After screening and review, three questions were dropped out, and 24 questions were re-modified to fit the study context. The questionnaire included two sections: section A covered demographic information, including age, income, gender, education level, etc.; in Section B of the questionnaire, there were questions pertaining to three main components and many sub-factors that would be able to moderate the impact of sustainable orientation on the relationship between entrepreneurial attributes and education in terms of the intention to pursue entrepreneurship. This section served as the primary source of data collection. Five enumerators, experts in data collection, were employed to conduct the physical survey. Students were given complete freedom to participate or even withdraw their participation. Respondents' full consent was confirmed to participate in the survey, and no gifts or allowances were provided to them. Data collection started in January 2023 and ended in March 2023. The survey took approximately 25 to 30 min to complete.

3.6 Data Analysis

Typically, the moderating impact evident in the literature on entrepreneurial intentions was analysed using AMOS-SEM (Brunel et al., 2017). In addition, preliminary analyses such as missing values, normality, linearity, demographics, and Statistical Package for Social Science (SPSS) were used for descriptive analysis. The maximum likelihood and two-step techniques (measurement and structural models) proposed by Anderson and Garbing (1988) were employed in this study. At the beginning of the analysis, it was seen how well and valid the instruments used to measure the constructs were. In the second step, the hypotheses proposed for this study were tested.

4. Results and Discussion

The demographic information for the respondents (N=410) is summarised in Table 1. The results in Table 1 indicate that 65.6% of participants were males and 34.4% were females. Most participants (below 30 years of age) were in the younger age group (e.g., cumulative value 96.4%). In terms of age, 46.8% of participants were between the ages of 21 and 23, while 43.9% were between the ages of 24 and 26. In most cases (83.4%), the participants were unmarried. Notably, 89.3 % of the respondents were Muslims, 8.8 % were Hindus, and 1.9 % were of other religions (such as Christians, Buddhists, and others). As the study's objective is to understand the influential determinants of the university student's entrepreneurial intention, only the students in the fourth year (64.4 %) and master's or MPhil (35.6 %) participated in this research. Among these respondents, all students were from business schools, and the majority (55.9 %) were from private universities. In the context of professional experience, the % of the students engaged in tuition. Regarding family income, most participants (31.5 %) reported their family income between BDT 20,000 and BDT 30,000, while around 20% (the second largest portion) reported income between BDT 31,000 and BDT 40,000 per month.

Table 1: Demographics of the respondents

Demographic Variables	Frequencies	Percentages	Cumulative Percentages
Gender			
Male	269	65.6%	65.6%
Female	141	34.4%	100.0%
Age			
Below 20	8	2.0%	2.0%
21-23	192	46.8%	48.8%
24-26	180	43.9%	92.7%
27-29	15	3.7%	96.4%
30 or above	15	3.7%	100%
Marital Status			

Married	68	16.6%	16.6%
Unmarried	342	83.4%	100.0%
Religion			
Islam	366	89.3%	89.3%
Hindu	36	8.8%	98.1%
Christian	3	0.7%	98.8%
Buddhist	4	1.0%	99.8%
Others	1	0.2%	100.0%
Level of Education			
Freshman (1st Year Undergraduate)	0		
Sophomore (2nd Year Undergraduate)	0		
Junior (3rd Year Undergraduate)	0		
Senior (4th Year Undergraduate)	264	64.4%	64.4%
Masters/ M-Phil	146	35.6%	100.0%
PhD	0	0%	100.0%
Others	0	0%	100.0%
Field of Study			
Business	410	100.0%	100.0%
University Category			
Private	229	55.9%	55.9%
Public	181	44.1%	100.0%
National			
International			
Previous Experience			
Business	78	19.0%	19.0%
Entrepreneurship	48	11.7%	30.7%
Tuition	151	36.8%	67.5%
Others	133	32.4%	100%
Family Income			
20-30 k BDT	129	31.5%	31.5%
31-40 K BDT	80	19.5%	51.0%
41-50 K BDT	77	18.8%	69.8%
51-60 K BDT	51	12.4%	82.2%
61 or above	73	17.8%	100.0%

4.2 Principal Component Analysis

Principal Component Analysis (PCA) with varimax rotation was used in this investigation. The findings showed a significant Bartlett's test of sphericity ($p < 0.05$) and a high Kaiser-Meyer-Olkin (KMO) score of 0.956. According to Tabachnick and Fidell (2014), both of these values were over the suggested cutoff, demonstrating the suitability of the sample. The study found seven components that together accounted for 67.71% of the total variance and had eigenvalues greater than 1.0.

4.3 Multivariate Assumptions

The study employs several multivariate tests before undertaking the structural equation modelling (SEM) study to measure the appropriateness of the acquired data for further examination. According to Hair et al. (2010), the data to be used in SEM should be free from outliers (e.g., missing values, straight lines, and out ranged values) and multicollinearity issues. In addition, the collected data should confirm that they are normally distributed.

According to Kline (2015), Pearson's skewness and kurtosis criteria were employed to assess the data's normality. Skewness scores between +3 and -3 and kurtosis values between +7 and -7 are the recommended ranges for determining data normality. Table 3 reveals that all values fit within this satisfactory range, confirming the data's normal distribution.

When researchers use self-reporting and self-sourced research designs, common method bias (CMB) is a typical issue that might occur. The 41 items in this study were employed to analyze all components utilizing Harman's single-factor test in order to solve this problem. According to Podsakoff et al. (2003), the variance of a single factor is suggested to be less than 50% as a cut-off number to ensure that CMB does not affect the results. The results (as given in Table 3) demonstrate that the variation of the single component is 40.017%, which is within the acceptable range and less than the 50% barrier. As a result, the dataset confirms that it is free from the CMB problem.

Finally, to address the multicollinearity issues, the variance inflation factor (VIF) and associated tolerance level were applied. The VIF thresholds and tolerance should be no greater than 10 and no less than 0.10 (Kline, 2011). Table 5 demonstrates that all VIF and tolerance levels remain within the accepted range. This implies that there is no problem with multicollinearity among the constructs.

Table 2: Mean, standard deviation, Variance, Skewness and Kurtosis Values

	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EI1	3.6854	1.06099	1.126	-.567	.121	-.233	.240
EI2	3.3854	1.04321	1.088	-.251	.121	-.627	.240
EI3	3.6512	1.05951	1.123	-.581	.121	-.298	.240
EI4	3.4024	1.09745	1.204	-.324	.121	-.514	.240
EI5	3.6171	1.07070	1.146	-.487	.121	-.442	.240
EI6	3.4951	1.01636	1.033	-.366	.121	-.440	.240
EI7	3.8244	1.13981	1.299	-.687	.121	-.466	.240
EI8	3.6976	1.11721	1.248	-.556	.121	-.400	.240
IN1	4.0951	.90811	.825	-1.035	.121	.913	.240
IN2	4.1317	.89400	.799	-.963	.121	.767	.240
IN3	3.7122	.88459	.782	-.362	.121	.150	.240
IN4	3.9610	.84694	.717	-.678	.121	.282	.240
IN5	3.9805	.85907	.738	-.730	.121	.415	.240
NA1	3.9780	.89388	.799	-.721	.121	.179	.240

NA2	3.9878	.89133	.794	-.892	.121	.847	.240
NA3	3.8317	.90013	.810	-.471	.121	-.209	.240
NA4	4.0317	.89905	.808	-.752	.121	.066	.240
NA5	3.8805	.85808	.736	-.398	.121	-.367	.240
AT1	4.2878	.90102	.812	-1.184	.121	.742	.240
AT2	4.2195	.84530	.715	-1.142	.121	1.318	.240
AT3	4.1683	.83239	.693	-1.014	.121	1.003	.240
AT4	4.0634	.79477	.632	-.907	.121	1.161	.240
AT5	4.0951	.77126	.595	-.711	.121	.570	.240
SC1	3.9707	.89230	.796	-.939	.121	1.129	.240
SC2	3.9220	.90029	.811	-.876	.121	1.014	.240
SC3	3.9780	.88564	.784	-.848	.121	.797	.240
SC4	3.9049	.88631	.786	-.808	.121	.904	.240
SC5	3.9902	.85066	.724	-.915	.121	1.237	.240
EE1	3.8488	.93900	.882	-.674	.121	.051	.240
EE2	3.8927	.94762	.898	-.737	.121	.107	.240
EE3	3.9024	.98658	.973	-.801	.121	.197	.240
EE4	3.9195	.90684	.822	-.809	.121	.657	.240
EE5	3.9317	.88741	.788	-.689	.121	.184	.240
EE6	3.8951	.96198	.925	-.799	.121	.340	.240
EE7	3.9659	.93233	.869	-.769	.121	.153	.240
EE8	3.8805	.90522	.819	-.577	.121	-.003	.240
SO1	3.7634	.93564	.875	-.700	.121	.366	.240
SO2	3.8976	.93779	.879	-.813	.121	.524	.240
SO3	3.8463	.93469	.874	-.610	.121	.058	.240
SO4	3.9171	.91065	.829	-.675	.121	.294	.240
SO5	4.0122	.87192	.760	-.869	.121	.834	.240

4.4 Measurement Model

The measurement model's overall goodness-of-fit rating is in line with suggestions made by Doll et al. (1994) and Hu & Bentler (1999), suggesting a good fit. The results show, specifically:

$$\chi^2 = 1383.431$$

$$\chi^2/\text{degree of freedom (DF)} = 1.825$$

$$\text{Goodness of Fit Index (GFI)} = 0.857$$

$$\text{Comparative Fit Index (CFI)} = 0.943$$

$$\text{Tucker-Lewis Index (TLI)} = 0.938$$

Root Mean Square Error of Approximation (RMSEA) = 0.045, with a significance level of $p=0.000$.

Refer to Table 3 for a breakdown of the measurement model's 41 elements and its seven components. According to the criteria set out by Fornell and Larcker (1981), all estimated constructs had good reliability, as evidenced by Composite Reliability (CR) values ranging from 0.851 to 0.917 and Cronbach's alpha values ranging from 0.85 to 0.917. Additionally, the Average Variance Extracted (AVE) ranged from 0.536 to 0.673, and factor loadings ranged from 0.632 to 0.868, all exceeding suggested levels, confirming the convergent validity of the measurement model (Fornell & Larcker, 1981; Hair et al., 2014).

Table 3: Item Loadings of Constructs with CR, AVE, and Cronbach 's Alpha Values

Constructs	Items	Loading	CR	AVE	Cronbach's Alpha
Entrepreneurial intention (EI)	EI1	0.701	0.910	0.561	0.910
	EI2	0.632			
	EI3	0.806			

	EI4	0.705			
	EI5	0.795			
	EI6	0.797			
	EI7	0.772			
	EI8	0.767			
Innovativeness (IN)	IN1	0.816	0.876	0.588	0.875
	IN2	0.787			
	IN3	0.639			
	IN4	0.804			
Need for Achievement (NA)	NA1	0.746	0.890	0.620	0.889
	NA2	0.826			
	NA3	0.75			
	NA4	0.868			
	NA5	0.737			
Autonomy (AT)	AT1	0.814	0.911	0.673	0.910
	AT2	0.859			
	AT3	0.838			
	AT4	0.795			
	AT5	0.794			
Self-Confidence (SC)	SC1	0.791	0.906	0.660	0.911
	SC2	0.815			
	SC3	0.836			
	SC4	0.805			
	SC5	0.813			
Entrepreneurial Education (EE)	EE1	0.755	0.917	0.580	0.917
	EE2	0.789			
	EE3	0.795			
	EE4	0.78			
	EE5	0.782			
	EE6	0.746			
	EE7	0.74			
	EE8	0.699			
Sustainable orientation (SO)	SO1	0.739	0.851	0.536	0.850
	SO2	0.841			
	SO3	0.738			
	SO4	0.649			
	SO5	0.679			

Table 4 displays the inter-correlations between the constructions indicated by non-diagonal components, and the diagonal elements correspond to the square root of AVE. All diagonal items in their respective rows and columns were greater than non-diagonal elements, matching the requirements for acceptable discriminant validity proposed by Fornell and Larcker (1981). Furthermore, all inter-correlation factors were significantly below the 0.85 threshold value, indicating that multicollinearity was avoided in the analysis (Kline, 2015).

Table 4: Discriminant Validity (Fornell-Larcker Criterion)

	SC	EI	IN	NA	AT	EE	SO
SC	0.812						
EI	0.509	0.749					
IN	0.697	0.554	0.767				
NA	0.613	0.469	0.706	0.787			

AT	0.667	0.417	0.685	0.714	0.820		
EE	0.580	0.468	0.501	0.508	0.583	0.761	
SO	0.627	0.579	0.646	0.532	0.465	0.544	0.732

4.5 Structural Model and Hypothesis Testing

The structural model showed good goodness-of-fit measures, with the following fit indices: $\chi^2 = 1349.461$ $\chi^2/DF = 1.780$. Root Mean Square Error of Approximation (RMSEA) = 0.044 Goodness of Fit Index (GFI) = 0.860 Comparative Fit Index (CFI) = 0.946. With a significance threshold of $p=0.000$, the Tucker-Lewis Index (TLI) was 0.942, and the Standardised Root Mean Squared Residual (SRMR) was 0.0425. The great validity and dependability of the model are shown by the alignment of these fit indices with the suggested ranges set out by Doll et al. (1994) and Hu & Bentler (1999).

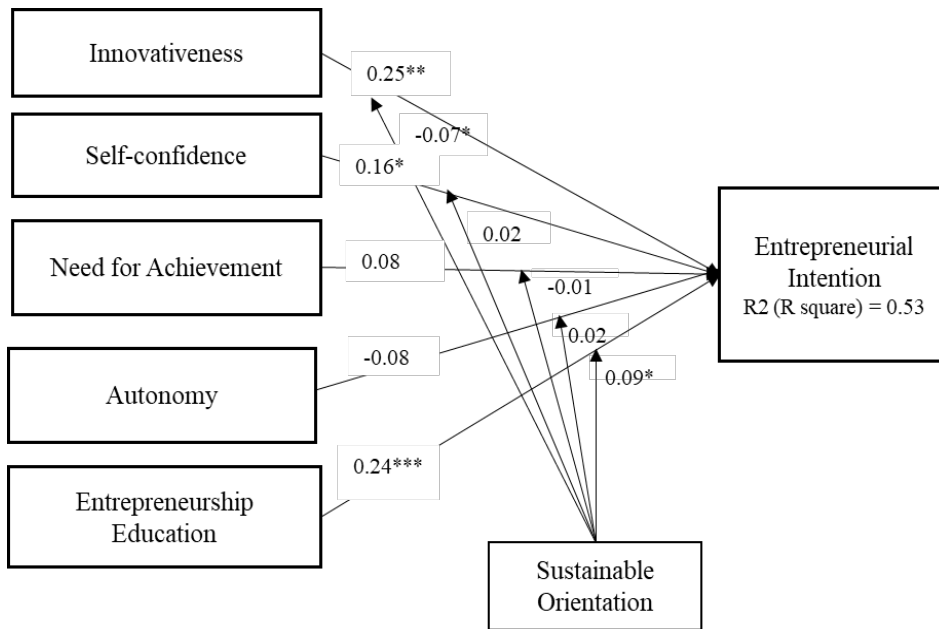
The study explores the impact of five antecedents on the dependent variable, entrepreneurial intention, in Table 5 and Figures 3 and 4. 53% of the variability in entrepreneurial intention is explained by these antecedents taken together ($R^2=0.53$). Following self-confidence ($=0.16$, $t=2.465$, $p=0.014$) and entrepreneurship education ($=0.24$, $t= 4.105$, $p=0.000$), innovativeness showed the most positive effect on entrepreneurial intention ($=0.25$; $t=3.072$, $p=0.002$). As a result, this study provides evidence in favour of hypotheses H1, H4, and H5.

However, the association between the need for achievement and entrepreneurial intention ($\beta=.082$, $t=0.159$, and $p=0.247$) and between autonomy and entrepreneurial intention ($\beta=-0.080$, $t=-1.088$, and $p=0.276$) were identified as insignificant. This suggests that H2 and H3 were not supported.

In the moderating effect, the results show that sustainable orientation strongly moderates the ties between innovativeness and entrepreneurial intention and between entrepreneurship education. Hence, H6 and H10 were accepted. It's crucial to note, though, that sustainable orientation was shown to have a negligible moderating impact on the associations between the need for autonomy, self-confidence, and accomplishment and entrepreneurial ambition. Therefore, the study did not support H7, H8, and H9.

Table 5: Standardized Estimation and Hypotheses Testing

Hypothesis No.	Hypothesis			Estimate (Standardized)	S.E.	t-Values	P-Values	Decision
H1	EI	<---	IN	.253	.104	3.072	.002	Yes
H2	EI	<---	NA	.082	.076	1.159	.247	No
H3	EI	<---	AT	-.080	.100	-1.088	.276	No
H4	EI	<---	SC	.164	.080	2.465	.014	Yes
H5	EI	<---	EE	.242	.078	4.105	0.000	Yes
SRMR				0.0425				
R ²				0.53				
Moderation Effects								
	EI	<---	SO					
H6	EI	<---	IN_X_SO	-.070	.033	-2.108	.035	Yes
H7	EI	<---	NA_X_SO	-.001	.041	-.032	.975	No
H8	EI	<---	AT_X_SO	.017	.037	.467	.641	No
H9	EI	<---	SC_X_SO	.015	.036	.429	.668	No
H10	EI	<---	EE_X_SO	.093	.039	2.365	.018	Yes



(Note: *** $p < 0.0001 < ** p < 0.001 < * p < 0.01$)

Figure 2: Results of the Proposed Model

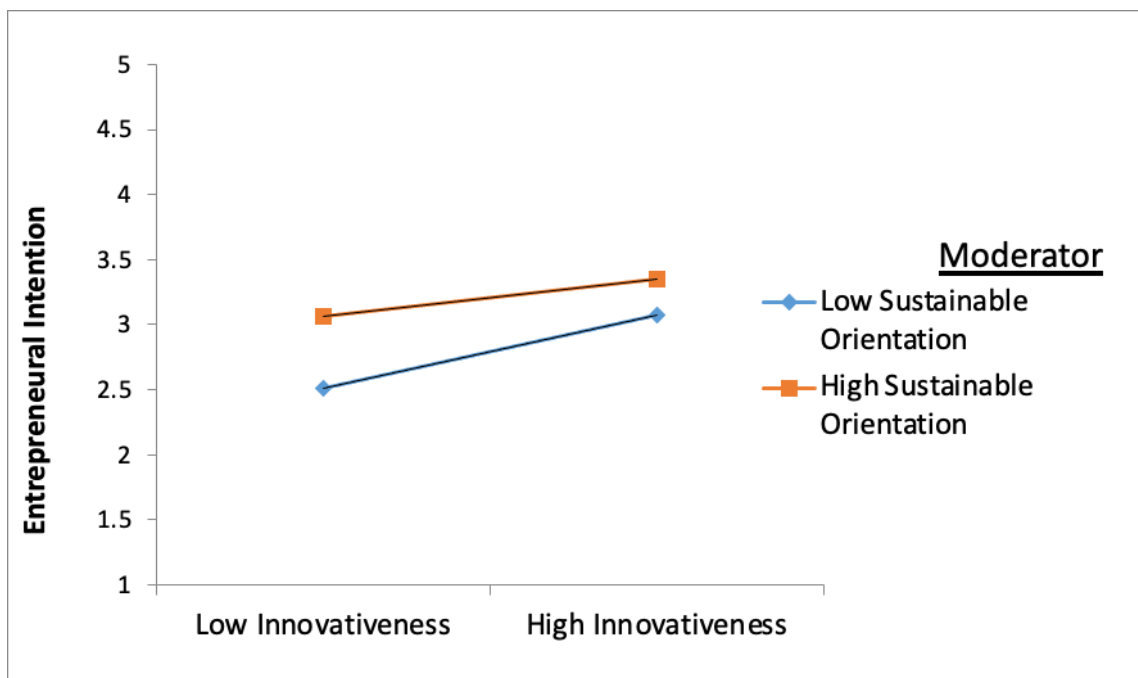


Figure 3: Sustainability's Moderating Role: Innovativeness and Entrepreneurial Intent

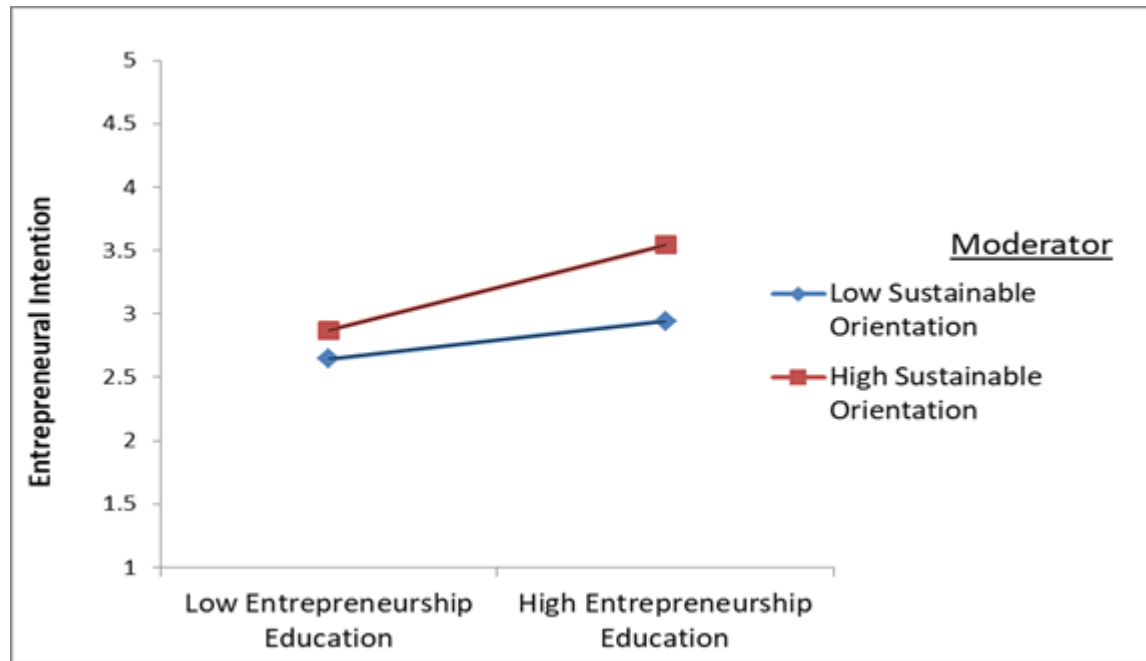


Figure 4: Sustainability's Moderating Role: education and Entrepreneurial Intent

4.6 Discussion

This study's main objective was to evaluate the impact of entrepreneurial education on business graduates in Bangladesh who were interested in starting their own businesses. It did this by using entrepreneurial traits and entrepreneurship education as predictors. Researchers in this study developed ten hypotheses intending to reach a decision. On the basis of the findings, the discussion has been segmented into several sections. The first finding was that innovativeness significantly and positively affects business graduates' intentions to start their own businesses in Bangladesh. Similar findings have been found in earlier research from Asian and European countries (Wathanakom et al., 2020). The findings stated that students with several entrepreneurial characteristics, including innovativeness skills, can easily understand which drives need to be taken to start a business.

Another hypothesis indicates that entrepreneurship education significantly enhances the entrepreneurial intent of Bangladeshi graduates. These results are in line with other studies carried out by Saptono et al. (2020) and Wardana et al. (2020) in Asia and Europe. According to study by Slavtchev et al. (2012), earlier studies have emphasized the importance of entrepreneurship education in spreading knowledge about it as a viable career option. For instance, classes in new business creation or business planning offered through entrepreneurship education may improve a student's self-employment chances and tendency to take entrepreneurial risks. Business graduates are three times more likely than non-business graduates to launch new businesses, which is consistent with the fact that business education typically emphasizes technical knowledge for business administration (Charney et al., 2000). These results demonstrate how simple it is for students to comprehend that launching a new business is challenging. In addition, entrepreneurship education can help students develop the information, abilities, standards, and values that boost their self-efficacy and encourage them to pursue entrepreneurial goals.

Nonetheless, a strong relationship has been found between self-confidence and entrepreneurial intentions among graduate students. Students with self-confidence tend to take entrepreneurial initiatives in the future. A similar result has been noticed in many earlier studies. For example, Turker and Selcuk (2009) stated that entrepreneurial intentions appear to be related to self-confidence, risk-taking, and locus of control. Additionally, Koh (1996) conducted an empirical study to determine whether self-confidence levels differ between entrepreneurially minded students and those who are not. According to his research, entrepreneurially inclined business students are more self-assured than those who are not.

Therefore, two hypotheses have been rejected, explained in the following section. First off, there is no statistically significant relationship between autonomy and the ambition of business graduates in Bangladesh to start their own firm. Although this finding is inconsistent with the results of a previous study conducted by Al-Mamary and Alshallaqi (2022), the results of our study can be justified from a Bangladeshi perspective. In Bangladesh, students need more autonomy when starting any career initiative. Societal and family influences significantly impact students' career decisions in Bangladesh (Zayed & Tumpa, 2016). According to a previous study, graduates of Bangladeshi universities are influenced mainly by aspiration for an ideal occupation, external locus of control, dependency on others, and family preferences. Therefore, the findings of our study are consistent in the studied country context. Second, it is proved that the need for achievement does not influence entrepreneurial intentions. In Bangladesh, graduate students are barely concerned about their future achievements. Most of the students are worried about this situation in which they belong. Although the need for achievement is one of the crucial factors of entrepreneurial characteristics, students think this kind of aspiration is optional to start a business. According to a study by Ida Ketut (2019), the need for achievement may not be a single component that motivates graduate students to start an entrepreneurial venture.

However, this study also endeavored to study the moderating effect of sustainability orientation in the relationship between observed and unobserved variables. This notable finding underscores that sustainability orientation has a positive moderating effect on the connection between entrepreneurship education and the entrepreneurial intentions of graduate students in Bangladesh. According to the previous literature and empirical findings regarding this hypothesis, there is a great deal of concern about ethical, social, and environmental issues that need to be learned before starting any entrepreneurial venture (Kuckertz & Wagner, 2010). If educators can provide knowledge and information regarding the benefits of sustainable entrepreneurship during entrepreneurship education, students will be greatly motivated to start new ventures (Baron & Kenny, 1986). The implication is that if the current entrepreneurial courses or programs are designed or personalized with ethical, social, and environmental concerns, they will enhance the effectiveness and efficiency of entrepreneurship education, which will impact entrepreneurial intentions.

Furthermore, sustainability orientation mitigates the connection between innovativeness and entrepreneurial intention. The indicators of innovativeness are regular engagement in new activities, completing actions differently, continuously searching for new technology and product ideas, developing new and creative ideas, and constantly using innovations in the workplace (Maziriri et al., 2019). Students who are sustainable-oriented seek to use viable technologies. Sometimes, implementing these technologies require extensive knowledge, high cost, and complex infrastructure. Therefore, sustainability orientation negatively affects the relationship between innovativeness and entrepreneurial intention. Although starting a new business with sustainable growth without innovativeness is difficult, it can be acquired through entrepreneurship education.

5. Conclusion

This study investigated the impact of entrepreneurial characteristics and entrepreneurship education on business students' entrepreneurial intentions. The findings shed light on the multifaceted landscape of entrepreneurial intention, which is significantly influenced by two characteristic variables (e.g., innovativeness and self-confidence) and entrepreneurship education, with the strong moderating effect of sustainable orientation on the ties of innovativeness and entrepreneurship education with entrepreneurial intention. These variables collectively shape Bangladeshi business graduates' mindsets toward entrepreneurial ventures. This study highlights the role of innovativeness needed to foster an environment ripe for entrepreneurial intent to ignite the spark of creativity and differentiation crucial for start-ups. Simultaneously, students' self-confidence can be influential, encouraging entrepreneurs to navigate uncertainties and setbacks inherent to the entrepreneurial journey. Additionally, the findings reveal that students' intention to act is significantly influenced by entrepreneurship education, which can equip them with the necessary tools, knowledge, and skills to transform their aspirations into the implementation of start-ups. Entrepreneurship education imparts practical insights and cultivates a mindset to identify opportunities and manage challenges to bolster the likelihood of translating intention into entrepreneurial action. However, the findings indicate that the ties between the need for achievement and autonomy and entrepreneurial intention are significant in Bangladesh. Even in many studies, the need for achievement and autonomy are noted

as propellers to pursuing challenges and seeking success aligning seamlessly with the freedom to manifest the risk-taking nature of entrepreneurship. The study's findings can provide valuable insights for stakeholders ranging from educators to policymakers, collaboratively fostering an ecosystem conducive to nurturing and realizing entrepreneurial intent. Ultimately, harmonizing and managing these influential variables can pave the way for a future enriched by enterprising ventures that drive economic progress and contribute to societal development.

4.7. Theoretical Contributions

This study's main theoretical contribution comes from its examination of the effects of entrepreneurial traits (such as inventiveness, need for achievement, autonomy, and self-confidence), as well as entrepreneurship education, on entrepreneurial intentions among university students in a developing nation. This investigation was done under the guidance of the Theory of Planned Behaviour (TPB) principles. Additionally, this study adds an empirical component to the body of literature already available about the entrepreneurial inclinations of business graduates. Notably, this study appears to be among the first to examine how education in entrepreneurial characteristics, entrepreneurial intention, and sustainability issues interact when applied to developing economies. The theoretical foundation of the study, which is based on TPB, emphasises the important and advantageous connection between entrepreneurial education and entrepreneurial intention. In addition, the moderating role of sustainability orientation in the relationship between observed and unobserved variables is measured through structural model development. The uniqueness of this study is its empirical analysis, which identifies the crucial factors influencing entrepreneurial intentions among business graduates. Theoretically, this study also supports and advances the original intention model, particularly the TPB, as a potential predictor of the effectiveness of entrepreneur education programs. Additionally, by examining the factors that affect the relationship between entrepreneurial education and intention, this study takes a contingency viewpoint. Even though there have been several research that have examined the connection between entrepreneurial education and entrepreneurial drive (e.g., Al-Mamary & Alshallaqi, 2022), this research deepens our understanding of this relationship by examining the moderating impact of sustainability orientation on the associations between various aspects of entrepreneurship education and entrepreneurial intention.

4.8. Practical Implications

This investigation has noteworthy consequences for students, academics, entrepreneurs, the government, and the country. This study incorporates entrepreneurship education with the entrepreneurial intention to foster an entrepreneurial mindset among Bangladeshi business graduates. This study has shown that business academics should think about changing the educational system to encourage students to have a stronger propensity for entrepreneurship. Moreover, the findings shed light on the necessity for educational institutions and governments to implement entrepreneurship programs aimed at increasing the intention of graduate students to start new businesses. Therefore, this study draws policymakers' attention to entrepreneurship education, entrepreneurial intention, and entrepreneurship. Regarding application, entrepreneurial education and personal characteristics, including innovativeness, need for achievement, autonomy, and self-confidence, are essential for identifying and inspiring students. This is especially important for students who have never been exposed to entrepreneurship or had negative entrepreneurial experiences. This can provide decisionmakers and educators a better understanding of these occurrences, allowing for more efficient interventions to increase the number of aspiring entrepreneurs. Additionally, the research provides valuable guidance for instructors in designing courses that allow them to create more effective entrepreneurship classes. Topics such as business planning, role models, the value of entrepreneurial networks, and feedback methods are all included in advice. Additionally, this strategy promotes a sincere entrepreneurial ethos. Nevertheless, this study outcomes influence public and private universities to have a broader purview of entrepreneurial courses that include a variety of subjects outside the conventional scope of business-related disciplines, such as engineering, medicine, geography, and history. This extensive use would develop a climate where anyone could start a business and cultivate a thorough understanding of entrepreneurship. Limitations and future research directions.

Despite the fact that this study contributes to the existing body of knowledge already available on entrepreneurship and entrepreneurial development, it involves some limitations and gaps that can be abridged in undertaking future

research. First, the study only considers four entrepreneur characteristics: innovativeness, need for achievement, autonomy, and self-confidence. Future studies should be initiated with other personal variables, such as risk-taking propensity, tolerance of ambiguity, subjective knowledge, and perceived social image. The current study can also be extended to include more specific variables involved in entrepreneurship education (e.g., existing curriculum, lecture notes, and syllabus). Second, the study shows the moderating effect of sustainable orientation with no mediation effect. The integration of both moderation and mediation can illustrate a certain behavior more comprehensively. Thus, we suggest extending the current study with both moderation and mediation. Additionally, the categorical variables (e.g., age, gender, education, experience, income, etc.) can be employed in future research to understand their moderation role in examining entrepreneurial intention. Third, this research solely investigates entrepreneurial intention regardless of actual and post-action behaviors such as satisfaction, well-being, and recommendation to others. Hence, future studies can also be extended to understand entrepreneurial intention and post-action behaviors. Finally, the investigation only includes a particular sample of respondents (e.g., business graduates) in Bangladesh. The results might vary if the study is conducted with another group of respondents (e.g., professional jobholders). Thus, future research is recommended with various groups of people in different contexts, such as countries and cultures.

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The Fundamental Problems of Improving the Socio-Economic of Small-Scale Fisheries

Eron L. Damanik¹, Maya Oktora², Suci Pujiastuti³, Tappil Rambe⁴, Glory Indira D. Purba⁵, Ayu Rulyani⁶,
Zanrison Naibaho⁷

¹ Department of Anthropology, Universitas Negeri Medan, North Sumatra, Indonesia

² Department of English Education, Universitas Negeri Medan, Indonesia

³ Department of German Language Education, Universitas Negeri Medan, Indonesia

⁴ Department of History Education, Universitas Negeri Medan, Indonesia

⁵ Department of Mathematic, Universitas Negeri Medan, North Sumatra, Indonesia

⁶ Department of Anthropology, Universitas Negeri Medan, North Sumatra, Indonesia

⁷ Department of Anthropology, Universitas Negeri Medan, North Sumatra, Indonesia

Correspondence: Eron L. Damanik, Department of Anthropology, Faculty of Social Sciences, Universitas Negeri Medan, 20221, North Sumatra, Indonesia. E-mail: eronddamanik@unimed.ac.id

Abstract

The collaborative research determined the basic obstacles and difficulties small-scale fisheries face to improve socio-economic quality and become more prosperous. The purpose was to explore the factors causing poverty despite providing aid and subsidies in the form of knowledge life skills and empowerment programs. Data were collected through in-depth interviews and focus group discussions on all phenomena and analyzed qualitatively. The results showed that the fishermen were lazy, resigned, apathetic, lacked initiative, irrational, and worked instinctively. Moreover, the attributes were identified as completely inconsistent with the efforts to improve the quality of life. In conclusion, without a rational work ethic, high discipline, hard work, material orientation, thrift, and savings, it is impossible to improve the quality of life.

Keywords: Ethos, Poverty, Fishermen, Socio-Economics

1. Introduction

The fundamental background for the research is the difficulty faced by small-scale fisheries in becoming prosperous. This is observed from the four-year empowerment program implemented in three different locations, including Deliserdang, Tanjung Balai, and Central Tapanuli. The program was in the form of workshops conducted by inviting fish cultivation experts to transfer knowledge on brackish and pond fish cultivation, life skills, equipment, seeds, feed, and basic daily needs with periodic monitoring. Moreover, the empowerment programs implemented by related agencies, the government, and corporations to alleviate the poverty of small-scale fisheries were also evaluated. From the context of the analysis conducted, the efforts implemented had not been able to improve the dignity of small fishermen. Therefore, this research essentially focused on determining the fundamental external and internal factors causing the poverty of small-scale fisheries in 12 different locations within North Sumatra Province.

The Republic of Indonesia State Fisheries Management Area (*Wilayah Pengelolaan Perikanan Negara Republik Indonesia* [WPP-NRI])¹ of North Sumatra Province is classified into two groups. The first, WPP-NRI 571, covers the waters of the Malacca Strait including Langkat, Medan, Deli Serdang, Serdang Bedagei, Tanjung Balai, Asahan, Labuhanbatu, and Batubara with moderate use (Damanik, Lubis, and Astuti, 2016). Meanwhile, the second, WPP-NRI 572, covers the waters of the western Indonesian Ocean Sumatra including Central Tapanuli, Sibolga, Mandailing Natal, and South Nias identified to have overfishing (Suman, Irianto, Satria, and Amri, 2016; Koeshendrajana, Rusastra, and Sukadi, 2019). The areas are the main fishing centres in North Sumatra Province and are selected as the location for this research. Unfortunately, the socio-economic life of the owners of small-scale fisheries in the area was categorized as “below the poverty line” or “extreme poverty.”

The fishermen in Indonesia are nationally divided into capture and cultivation groups. In 2022, those in the catch group were 3,033,941 consisting of 2,401,540, at sea and 632,401 in inland waters (Satria, 2009b). Meanwhile, the aquaculture group had 2,120,312 consisting of 266,602 cultivating at the sea, 401,304 in brackish water, and 1,332,507 in the freshwater (Marine and Fisheries Ministry (*Kementerian Kelautan dan Perikanan* [KKP], 2022). Although the source is questionable, 60-80 percent are small-scale fisheries categorized to be poor and below the poverty line (Anwar, 2019; Damanik, Suhana, and Prasetyamatati, 2008; Nurjaya, 2009; Solihin, 2020; Central Bureau of Statistics (*Biro Pusat Statistik* [BPS]), 2023; KKP, 2023).

Indonesia is one of the largest fishing countries in the world dominated by small-scale fisheries. It is also a maritime and island country where people capture fish as a source of income and foreign exchange, and to improve national food and nutritional security. However, the fishermen are in extreme poverty even though the maritime country has 2/3 of its territory covered by sea, lakes, and rivers which are expected to support prosperity (Satria, 2009a; Shahputra, 2023; Ambari, 2023b; 2023c). Most of the small-scale fisheries live in coastal slum areas with houses on stilts, poor sanitation, limited sources of clean water, several school dropouts, and are shackled by debt. The general habit is to catch fish based on instinct (Kusnadi, 2002; 2006), ecological changes (Helmi and Satria, 2012) and subsistence orientation (Mubyarto, 1984).

The activities are also often conducted using ships that are less than 5 Gross Tons (GT) (Arsandi, Afriyanto, and Kumalasari, 2022). Several assistance, workshops, policies, regulations, and social assistance have been launched in the area but the transfer of knowledge, family financial management, health, relevant tools, equipment, and even houses are poor for most fishermen (Ambari, 2023a; Imron, 2006; Kusnadi, 2009). It was observed that the groups of fishermen are contributors to the highest poverty rate as well as the lowest social strata in the country (Mubyarto, 1984). Therefore, the trend led to the need to answer the question “What's wrong with Indonesian small-scale fisheries today?”

Poverty is perceived from different dimensions, including the economic, social, cultural, and political aspects (Nugroho, 1995). However, it is most easily explained based on economic dimensions which are synonymous with the material inability to live prosperously. In the cultural dimension, poverty is a certain response to life, including wastefulness, hopelessness, helplessness, and apathy. Politically, it is defined as the marginalization of poor groups at the bottom of the social structure and subsequent exemption from the decision-making process. Socially, the concept is explained as poor living standards, behaviour, and way of thinking that is less oriented toward prosperity (Acheson, 1981). Meanwhile, the parameters of poverty differ in each country but are based on three prerequisites of disability which include the lack of (1) material to fulfil clothing, shelter, food, education, and health, (2) participation in society, and (3) minimum income. It is also differentiated by ownership of infrastructure and family, including several limited facilities. The two important points related to poverty are vulnerability and helplessness which are the tendency of poor people to experience difficulties in dealing with emergencies (Nugroho, 1995).

¹The Republic of Indonesia State Fisheries Management Area (*Wilayah Pengelolaan Perikanan Negara Republik Indonesia* [WPP-NRI]) is a fisheries management area based on the diversity of marine resources, seabed morphology, regional characteristics, ecology, and sea boundaries which are used as the basis for sustainable fisheries management. The numbering and naming are adjusted to the International Maritime Organization (IMO), International Hydrographic Organization (IHO), and Food and Agriculture Organization (FAO)

The basic needs approach recommended by the World Bank (Baah et al., 2023) classified poverty into two groups, including (1) absolute for those with income below US\$ 1 or IDR 15,000 per day and (2) medium for US\$ 2 or IDR 30,000 per day. This approach provides a poverty line (*Garis Kemiskinan* [GK]) where each person is categorized as poor when the daily income is less than US\$ 2 or IDR 30,000. More specifically in Indonesia, GK is the sum of monthly per capita expenditure on the Food Poverty Line (*Garis Kemiskinan Makanan* [GKM]) and non-food Poverty Line (*Garis Kemiskinan non-Makanan* [GKNM]). Therefore, poverty is divided into four categories, including (1) absolute for the inability to fulfil primary needs, (2) relative for the lack of capacity due to uneven development, (3) cultural based on negative habits, and (4) structural which is associated with the inability to utilize existing resources.

The average income of small-scale fisheries is estimated at IDR 750,000-2,000,000 per month which is far below the average gross demographic product (GDP) of IDR 5,183,333 per capita per month or the equivalent of IDR 62,200,000 per capita per year set in 2023. It is also significantly under the GK standard of IDR 535,547 per person per month or the equivalent of US\$ 2.16 per person per day set by the World Bank. Meanwhile, the poverty line per household per month is IDR. 2,592,657 which is inversely proportional to the average monthly income, indicating the average fisherman in Indonesia reflects a poor society. According to the Central Bureau of Statistics (2021), people with expenditures below IDR 10,739 per person per day or IDR 322,170 per person per month are categorized as extremely poor. This further led to the inference that the fishermen were average in extreme poverty (Imron, 2003; Kusnadi, 2008). The exchange rate index (*Nilai Tukar Nelayan* [NTN]) which measures the catches compared to household production and consumption needs shows a deficit of 98.66, thereby showing the increase in income is not commensurate with expenditure (Retnowati, 2011; Manadiyanto, 2002).

The causes of poverty include all limitations of employment, education and knowledge, social injustice, water and food resources, infrastructure, government support, health, prices, conflict or unrest as well as climate change or natural disasters. The continuation of poverty has the potential to lead to crime, unemployment, limited access to education, poor health, death, chaos, and even bankruptcy. Therefore, this research explores the poverty among the fishermen in 12 locations within North Sumatra. Poor fishermen were defined as those with the lack of capacity and power to fulfil the necessities of life based on two indicators, including basic needs such as food, clothing, and shelter, and (2) limited access to others in the form of health, sanitation, clean water, transportation, and education.

In the book, *Sustainable Fishery Systems*, Charles (2001) emphasizes an integrated, interdisciplinary approach to building sustainable fisheries. This holistic system focuses on structure, operations, and dynamics based on six dominant themes in "sustainable fisheries," including sustainability, uncertainty, complexity, conflict, fishing rights, and the nature of management. The integration of the three reflects external and internal factors influencing welfare in the fisheries sector. Therefore, this research aimed to improve the quality of life for small-scale fisheries and alleviate poverty for a more prosperous life by discovering the fundamental problems.

2. Method

The focus of this research was on small-scale fisheries catching fish at marine in 12 different locations within North Sumatra, including Central Tapanuli, Sibolga, Mandailing Natal, South Nias, Langkat, Medan, Deli Serdang, Serdang Bedagei, Tanjung Balai, Asahan, Labuhanbatu, and Batubara. It was conducted qualitatively according to social research (Bryman, 2012) with a mixed approach (Creswell, 2014; Schutt, 2016). The main purpose was to explore the most basic external and internal factors causing poverty among small-scale fisheries. The literature review was conducted through four sequential stages, including (1) reading abstracts to determine relevance based on databases, (2) evaluating relevant publications, (3) categorization according to analysis and type of problem, as well as (4) most cited publications based on e-books, e-journals, reports, or official web (vom Brocke, 2015).

Data was collected through observation, in-depth interviews, questionnaires, and focus group discussions. Moreover, reflective data was enriched by watching, asking, and examining during the collection process (Kozinets, 2010). Observations were also made to look closely at the household, economic, and social conditions

of small-scale fisheries in all locations. The in-depth interviews were intended to extract comprehensive information from 25 randomly determined informants. Furthermore, a questionnaire containing 15 questions with 4 options according to the Likert Scale (Bertram, 2007) as well as 2 qualitative statements was distributed to 250 informants. Each factor and attribute was described by designating a value or score according to the response provided by the informant to obtain and determine the most dominant factor influencing poverty among small-scale fisheries.

A focus group discussion was held for one day in Medan on July 29, 2024, inviting 35 representatives from the research location. All informants were allowed to express opinions, life experiences, complaints, and hopes. Moreover, the questions focused on obtaining information on basic obstacles limiting fishermen from transforming into prosperous communities. All the data and information were considered narrative text, a series of events, and chronologically based on the competency of informants and were transcribed verbatim, categorized, and tabulated manually. A qualitative and interpretative analysis was applied to provide conclusions and recommendations for further research. It is important to state that the research was conducted throughout 2023-2024.

3. Results and Discussions

In Indonesia, North Sumatra covering an area of 72,981.23 km² is the fourth largest province after West, East, and Central Java. The province is located at 10-40° North Latitude and 98°-100° East Longitude, and is flanked by two bodies of water, the Malacca Strait on the east coast and the Indonesian Ocean on the west coast. Topographically, it is mountainous with the west coast observed to be a steep ravine, the east coast is a sloping area, and the central part is the Bukit Barisan Mountains which extend from Aceh in the north to Palembang in the south. Moreover, the volcanic earthquake that hit the mountains formed the Lake Toba caldera. There are also the Nias Islands off the Indonesian Ocean as far as 283 km from Medan which is the provincial capital.

The east coast is a sloping area with several large and long rivers originating from the Bukit Barisan Mountains and emptying into the Malacca Strait. The area around the river is densely populated with brackish water fishing activities while the Malacca Strait is a marine fishing area dominated by Malay, Karo, Simalungun, and Javanese. The central part is a plateau with minimal population and only allows dry cultivation activities and the dominant residents are Toba, Pakpak, and Karo. Moreover, the west coast is a rugged area and the sea is the source of livelihood for the people which are mainly Toba, Angkola, and Mandailing. The Nias Islands cover an area of 4,771 km² located off the Indonesian Ocean with the main population being the Nias fishing at sea. It is also important to state that Lake Toba covers an area of 1,130 km² north of Tapanuli and allows the people to catch freshwater fish or cultivate in cages.

The Strait of Malacca on the east coast of North Sumatra is the WPP-NRI 571 with a medium level of fishing. In this region, Langkat, Medan, Deli Serdang, Serdang Bedagai, Tanjung Balai, Batubara, Asahan, and Labuhanbatu are the main fishing centres. Furthermore, the Indonesian Ocean on the west coast is WPP-NRI 572 with overfishing where Central Tapanuli, Sibolga, Mandailing Natal, and Nias are the main centres. Figure 1 is a map of the main fishing centres in North Sumatra Province.

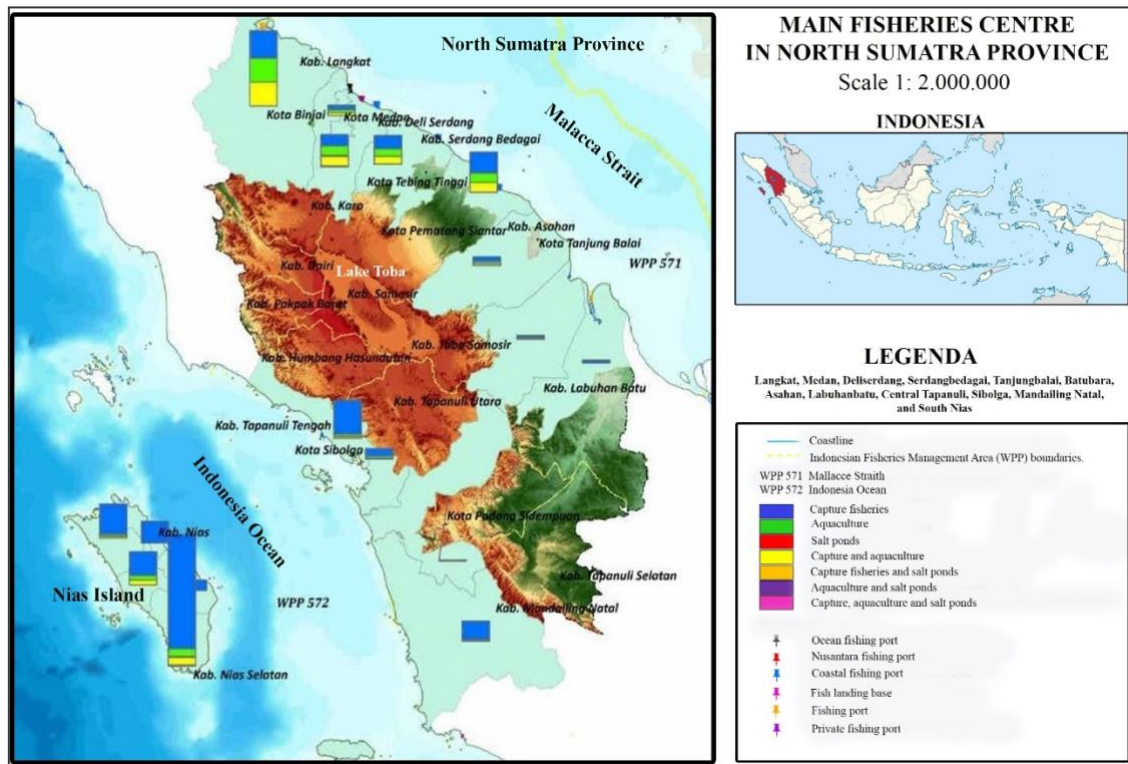


Figure 1: Map of the main fishing centres in North Sumatra Province

Data from the KKP (2023) showed that 166,005 fishermen were in North Sumatra consisting of 149,875 in marine and 16,130 on land, including rivers, swamps, springs, reservoirs, and artificial ecosystems. A total of 65,164 cultivating fishermen were identified, including 450 at sea, 9,726 in brackish, and 48,576 in freshwater. Meanwhile, the BPS (2022) provided different data which divided 170,224 fishermen into two categories, including 122,212 permanent and 48,012 part-time. Although this figure is doubtful, 60-80 percent are small-scale fisheries working personally or in groups of 3-4 with simple equipment, vessels weighing less than 5 GT, outboard boats, or without engines, and are subsistence-oriented. Table 1 provides information on the number of fishermen in 12 main fishing centres within North Sumatra Province throughout 2021-2023.

Table 1: Fishermen in 12 main fishing centres in North Sumatra Province, 2021-2023

Fisheries locations	2021	2022	2023
Central Tapanuli	25.045	25.045	25.114
Sibolga	8.310	8.310	8.714
Mandailing Natal	1.249	1.249	1.678
South Nias	5.372	5.372	5.923
Langkat	19.090	19.090	19.540
Medan	12.291	12.291	12.455
Deliserdang	13.953	13.953	14.234
Serdangbedagei	11.030	10.030	10.341
Tanjungbalai	14.058	14.058	14.157
Asahan	20.167	20.167	20.456
Labuhanbatu	6.369	6.369	6.768
Batubara	20.487	20.487	20.872
Total	152.421	156.401	161.252

Source: Department of Communication and Information of North Sumatra Province, 2023

The data in Table 1 showed that the number of fishermen in 2022 was 170,280 consisting of 119,063 permanent, 51,020 main part-time, and 197 additional part-time. In 2023, the number reduced to 161,256 which was not much different from 170,280, and were fishing in seas, lakes, rivers, and swamps or cultivating in brackish and freshwater ponds using intercropping, floating nets, and cages. There were three main reasons behind the increase

which were (1) limited employment opportunities, (2) bankruptcy due to the Covid-19 pandemic, and (3) the addition of new family members. Furthermore, Table 2 shows the statistics related to small-scale fisheries in North Sumatra in 2023.

Table 2: Small-scale fisheries in North Sumatra Province, 2023

Fisheries locations	Total fisheries	Small fisheries	Marine fisheries	Inland fisheries			Aquaculture		
				River	Swamp	Ponds	Marine	Brackish	Fresh
Central Tapanuli	25.114	23.534	23.298	53	29	-	97	57	-
Sibolga	8.714	7.876	7.751	47	19	-	42	17	-
Mandailing Natal	1.678	1.348	1.193	29	31	-	32	12	51
South Nias	5.923	5.117	4.862	63	88	-	32	72	-
Langkat	19.540	19.011	18.658	43	103	11	88	81	27
Medan	12.455	12.052	11.828	21	111	-	-	92	-
Deliserdang	14.234	13.782	13.377	34	141	-	112	87	31
Serdang Bedagei	10.341	9.573	9.211	97	72	21	101	71	-
Tanjung Balai	14.157	12.945	12.570	88	54	-	132	101	-
Asahan	20.456	19.471	18.779	56	201	32	197	134	72
Labuhanbatu	6.768	5.971	5.711	27	42	-	72	98	21
Batubara	20.872	19.429	19.211	54	32	-	54	78	-
Sub-total	-	-	-	612	923	64	959	900	202
Total	161.252	150.109	146.449		1599			2.061	

The information in Table 2 showed that 150,109 were small-scale fisheries consisting of 146,449 in marine, 1,599 on land, and 2,061 categorized as aquaculture. The data showed that marine fisheries were the main source of income for the people. Meanwhile, the basic problem in WPP-NRI 572, more specifically in the west of North Sumatra, was overfishing or excessive fishing. This situation has an impact on small-scale fisheries experiencing difficulty in catching fish, leading to erratic and fluctuating income trends. The highest per capita income was recorded to be IDR 25,000-IDR 50,000 per day or IDR 750,000-IDR 1,500,000 per month while a small number of others earned IDR 35,000-IDR 65,000 per day or IDR 1,050,000-IDR 1,950,000 per month. All the income was used to meet all daily needs, specifically food and non-food such as school, social services, lighting, health, and capital for fishing operations.

The income was observed to be significantly lower than the average gross domestic product in 2023 which was set at IDR 5,183,333 per capita per month or the equivalent of IDR 62,200,000 per capita per year. It was also far below the poverty line standard of IDR 535,547 per person per month or the equivalent of US\$ 2.16 per person per day set by the World Bank. The data showed that the majority of small-scale fisheries reflected medium and even absolute poverty. Furthermore, the basic needs approach places the fishermen with an income less than US\$ 2 or IDR 30,000 per day below the poverty line or in extreme poverty. This reference strongly indicates a less prosperous situation considering the limitation of the fishermen in meeting food and non-food needs.

Considering the high level of poverty in Indonesia, including among small-scale fisheries, the Indonesian Government issued regulations to improve the quality of life. This was observed from the implementation of Law Number 7 of 2016 concerning the Protection of Fishermen, Law Number 32 of 2014 concerning Maritime Affairs, and Law Number 45 of 2009 concerning Amendments to Law Number 31 of 2004 concerning Fisheries. Almost all the fishermen participated in national programs such as the Smart Indonesia Program (*Program Indonesia Pintar* [PIP]) for education, the National Health Insurance Program (*Program Jaminan Kesehatan Nasional* [PKJN]), the Family Hope Program (*Program Keluarga Harapan* [PKH]), and Non-Cash Food Assistance.

Through the Smart Indonesia Program conducted from 2018 to 2023, the government provided different financial educational assistance to 19.7 million students from elementary to high school, ranging from IDR 450,000 per child per year for elementary to IDR 750,000 for junior high and IDR 1,000,000 for high schools. Moreover, health assistance was provided to 96 million underprivileged people and family assistance amounting to IDR 1,890,000 per year per beneficiary group (*Kelompok Penerima Manfaat* [KPM]) was given to 10 million recipients to improve welfare. Lastly, non-cash food assistance of IDR 110,000 per month was distributed to 15.5 million recipient groups through the PKH (Coordinating Ministry for Human Development and Culture, **2018**).

The Coordinating Ministry for Economic Affairs (*Kementerian Koordinator bidang Perekonomian*), the Ministry of Maritime Affairs and Fisheries (*Kementerian Kelautan dan Perikanan*), the Maritime Affairs and Fisheries Service (*Dinas Kelautan dan Perikanan*), the Community Empowerment Agency (*Badan Pemberdayaan Masyarakat* [Bapemas]), the Social Service (*Dinas Sosial*), the National Unity and Community Protection Service (*Dinas Kesatuan Bangsa dan Perlindungan Masyarakat*), the Health Service (*Dinas Kesehatan*), the National Population and Family Planning Agency (*Badan Kependudukan dan Keluarga Berencana Nasional* [BKKBN]), and several fishermen organizations including the Association of Indonesian Fishermen (*Persatuan Nelayan Indonesia* [PNI]), the Indonesian Traditional Fishermen's Association (*Himpunan Nelayan Tradisional Indonesia* [HNTI]), and the Indonesian Fishermen's Union (*Serikat Nelayan Indonesia* [SNI]) routinely implemented empowerment programs.

Some of these included knowledge transfer, workshops, family financial management, education, and health, as well as assistance with capital, tools, equipment, and houses. For example, the Coordinating Ministry for the Economy launched Micro Business Productive Assistance (*Bantuan Produktif Usaha Mikro* [BPUM]) in 2022 to reduce extreme poverty in Indonesia. More specifically, IDR 600,000 per person per month was provided for 1.76 million marine and fisheries business actors operating as labour fishermen, without boats, or with boats lesser than 5 GT (Limanseto, 2022). The KKP also initiated Fishermen's Insurance Premium Assistance for 500,000 people including fuel subsidies in 2017.

The Indonesian government planned to provide subsidies covering ship improvements, fishing gear, ship search technology, refrigerators, fuel, ice, bait, personal, social and insurance costs, operators and workers, fish selling prices, support for marine activities, and losses to fishing operations from 2022 to 2024. As of November 2023, the assistance of 17,436 units of fishing equipment and 1,205 units of fishing boat engines had been launched in 85 locations with advanced fishing village production infrastructure in 79 others. Furthermore, 1,100 units of fishing boat engines, 15,000 units of fishing equipment, and production facilities were provided as subsidies in April 2024 at 55 advanced fishing village locations (Grahadyarini, 2024).

The government claimed that all these programs would have reduced extreme poverty by 2.04% or 5.59 million in December 2023. However, the small-scale fisheries in Indonesia are currently not prosperous because the aid and subsidies tend not to be well-targeted but are mostly enjoyed by large-scale fisheries actors. The trend showed that assistance and policies proposed by the government were not on target and failed to improve the quality of life for small-scale fisheries. It was further observed that the highest percentage of the fuel oil subsidies provided were enjoyed more by large fisheries.

The 13th Ministerial Conference (MC13) of the World Trade Organization (WTO) held on 26 February-2 March 2024 in Abu Dhabi issued an eight-point Fisheries Subsidies Agreement (FSA) (WTO, 2024). Meanwhile, the Indonesian government determined to launch subsidies through flexible fisheries management as well as implement Special and Differential Treatment (S&DT) (Grahadyarini, 2024). The prohibition program was applied to stop the epidemic of illegal, unreported, and unregulated (IUU) fishing (Food Agriculture Organization [FAO], 2024) towards reducing overfishing over capacity (OFOC) but considered a dilemma for small-scale fisheries in developing countries such as Indonesia.

In addition to several ineffectively implemented policies and programs, the Indonesian government focuses on formulating policies to eradicate the poverty of the relatively large number of fishermen. This shows there is a need to improve the living standard for small-scale fisheries based on three main considerations, including (1)

sustainable efforts to reduce extreme poverty, (2) assisting with sustainable capital and technology to improve quality of life, as well as (3) assistance and sustainable empowerment. There is also the need for an effective mechanism to ensure all the policies and assistance are targeted at the right recipients.

The small-scale fisheries in Indonesia are currently categorized to be below the poverty line and experiencing extreme poverty. It was also observed from the field observation results that most of the fishermen lived on the coast in slums, dirty, poorly sanitized, unhygienic, and salty environments. Most of the houses were on stilts with brackish water underneath and had tin or thatch roofs as well as wooden walls and floors as observed in Bugis Village in Central Tapanuli. A small number of others had tin roofs, walls, and cement floors, but were not free from the influence of the high tide as observed in Pangkalansusu, Kampai Island, Sambilan Island and Pangkalan Brandan in Langkat, Belawan in Medan, Percut Seituan in Deliserdang, and Boga in Batubara. At certain times, usually in the middle of the month, the “big tide” often submerges most houses in water between 30-75 cm at Natal, Mandailing, and Mengkudu Bay in Serdangbedagei, Asahan, and Tanjung Balai. Meanwhile, all the houses were installed with subsidized electricity of 450 volt-amperes (VA) and equipped with credit-driven dispensers, rice cookers, freezers, televisions, and motorbikes. Even though the small-scale fisheries were poor, most had smartphones connected to social media.

The basic problem identified in the environment was the difficulty in getting clean water because most bathing, washing, cooking, and defecation activities were conducted using brackish and turbid water. Even though clean water is available from the government, most fishermen buy water treated using reverse osmosis (RO) for IDR 6,500 per 20 litres. Moreover, most children drop out of school due to lack of funds or the relatively long distance from home, leading to several finishing only elementary or middle school. Another problem is the Community Health Center (*Pusat Kesehatan Masyarakat* [Puskesmas]) and the Integrated Service Center (*Pos Pelayanan Terpadu* [Posyandu]) located far away in the sub-district capital, leading to difficulty for people in fishing settlements to check the health of children, pregnancy, and parents. Most fishermen have thin bodies, dull faces, and dark bodies due to limited nutrition, extreme weather, the influence of salt water, and an unhygienic living environment. The results presented in Table 3 were used to identify and categorize the factors causing poverty among small-scale fisheries based on the questionnaire distributed to 250 informants. For the record, the scores were based on the choice made by the informants on the questionnaire.

Table 3: Determinants of poverty for small scale-fisheries

Main factors	Attribute	Score
Socials	Education and skills	172
	Work experience	181
	Institutional	165
Economic	Working capital	250
	Work tools and equipment	250
	Distribution and marketing	250
Cultures	Religion and belief	151
	customs	162
	Patterns of thought and behaviour	169
Work ecosystem	Mileage	242
	Fuel	250
	Climate or weather	250
	Water pollution	250
	Availability of fish	250
	Fishing competitors	250
Government intervention	Regulations	250
	Social assistance	250
	Capital assistance	250
	Selling price	250

The information in Table 3 showed that the five main poverty determinants were categorized into two, including the external factors such as the employment ecosystem and government intervention, and internal ones in the form of the social, economic, and cultural environment. It is important to state that the external factors are not within

the control of the fishermen and despite the relationship with poverty, some other factors also have influence. For example, well-targeted social assistance and subsidies, new technological inventions, easy loans, and relatively stable marketing prices can assist fishermen in getting out of poverty. However, the interventions are often exploited by government officials, including service heads, sub-district heads, village heads, and hamlet heads as well as non-governmental organizations.

An example was the complaints received from Belawan that the village head exploited the recipients of aid through deductions even though the fund was transferred directly to their accounts. This was achieved by mobilizing the recipients to deduct from the aid in the bank followed by threats of removing anyone that disclosed or published the action on social media. The phenomenon is common in institutions located in the area, including Pangkalanbrandan in Langkat, Boga Beach in Batubara, Bugis Village in Central Tapanuli, and several fishing villages on the Nias Islands. Another example was the diversion of educational assistance to elementary, middle, and high school students by corrupt-related agencies. This showed that authorized officials contributed to the worsening poverty because the aid and subsidies provided to the people were corrupted.

The tendency of children to drop out of school was very high with average observed to have completed only middle and high school. Few of those who continued to high school relied on government assistance. Moreover, the requirements, procedures, and competition in the Indonesia Smart-College Card (*Kartu Indonesia Pintar-Kuliah* [KIP-K]) provided by the government were observed to be relatively tight. Most children in other families, apart from school dropouts, were unemployed or assisting their parents. A similar trend was observed in the health sector with most identified to have selected the Healthy Indonesia Card (*Kartu Indonesia Sehat* [KIS]) which did not require paying any charges. The option is different from class C health insurance which requires contributions of IDR 25,000 per person per month and is considered to be a burden by most small-scale fisheries. Ironically, quite a few family members are trapped in narcotics, online gambling, and online loans.

About the internal factors, field observations confirmed the influence on socio-economic conditions. The facts showed four important points, including the fact that the small-scale fisheries had (1) accepted the fate of being a helpless “weak person,” (2) extended a lot of hands to the government, corporations, institutions, or philanthropy, (3) lacked the enthusiasm to improve the quality of life, and (4) led a lifestyle that was not commensurate with income level. This was observed from the trend that several fishermen spent their income to imitate unaffordable lifestyles by buying household equipment, clothing, and food. Quite a few were also willing to pawn production tools or take out loans to hold ceremonies and rituals around the circle of life. In other cases, some stopped fishing activities after receiving cash assistance and subsidies while others sell the equipment collected as aids to earn money. These actions do not support social change but rather trigger new dependency and poverty which hamper development (So, 1990). Unfortunately, education was observed not to be a priority for the people and was considered a wasteful investment.

The poverty among the fishermen was considered to be plural with four classes, including (1) absolute when the person was unable to meet primary needs, (2) relative where development was uneven, (3) cultural in the case of negative living habits, and (4) structural due to the inability to utilize existing resources. The paradox of fishing poverty is addressed in a dilemma due to the uneven development and regulatory inequality as well as work ethic and habitus. Several scholars put forward social, economic, and cultural factors, as the three main determinants of poverty (Dillon and Hermanto, 1993). The first factor includes education and skills, age, institutional and work experience, the second is capital, work, and distribution, while the third focuses on religion, belief, habits, behaviour, and customs. Others are operational costs, labour, distance travelled, equipment, fuel, selling price, and depletion of resources (Sujarno, 2008).

The irony of the situation around the fishermen observed from the abundance of marine resources and the trap of poverty showed the fundamental root of the problem to be (1) low mindset, (2) limited fish availability, (3) water pollution and ecosystem damage, (4) limited access to capital, (5) limited technology and simple management, (6) uneven distribution of results, and (7) limited market access (Damanik, Berutu, Purba, and Rulyani, 2023). This statement, although reasonable, does not summarize the most important factors behind the poverty of the fishermen. In several cases, the complexity of the problems is inseparable from the aspects influencing the

maintenance of poverty such as (1) uncertain seasons, (2) low human resources, (3) simple equipment, (4) limited catches, (5) life attitudes and motivation, and (6) government interference (Dahuri, Rais, Ginting, and Sitepu, 1996). Other scholars stated that the three reasons for poverty were (1) technological limitations, (2) debt bondage, and (3) marketing (Nugroho, 2003).

The process of ending poverty is not easy with the biggest difficulty and challenge observed not to be the intensity and quantity of empowerment programs but rather the work ethic. Despite the capital support such as aid and subsidies provided, facts showed that poverty did not reduce. This was confirmed by the continuous widespread development of new levels of poverty even though high levels of aid and subsidies, both cash and non-cash, were provided for the fishermen. The trend is associated with the tendency of the aid and subsidies to make the people lazy and willing to wait for the next batch instead of working. This shows that the mechanism is not the best approach because every house has a "poor sign" even from the data collected by the military and police.

Most fishing phenomenon in Indonesia is in line with the dependency theory where the poverty of the fishermen in the Third World is believed to be complicated by the state. The subsidies and state assistance intended to assist society end up contributing to social inequality and hegemony in several cases, causing economic, social, cultural, and political poverty. The observation is based on the culture and mentality held which is contrary to the concept of modernization (Koentjaraningrat, 1985). This made the father of Indonesian Anthropology remind the government in the New Order era to stop playing the role "as a teacher" and consider the public "as stupid students." The modernization theory implemented at the time was "The Stage of Economic Growth: A non-communist Manifesto" introduced by Rostow (1991). It states that not all activities of the government are in line with the culture and mentality of the Indonesian people. This statement was made considering the several cases of failure of development programs, specifically the self-sufficiency in the food sector implemented in 1982.

The observation from the small-scale fisheries in the 12 research locations showed that poverty did not solely depend on policies, regulations, or government subsidies and assistance, but rather on work ethic and habitus. The government is required to improve the dignity of society but there is a need to first provide early knowledge and life skills through workshops, seminars, or empowerment to gradually internalize work ethic into the habitus of the people. This is necessary because work ethic is the mental attitude, a guide to motivate high work enthusiasm, initiative, perseverance, discipline, never giving up attitude, ability to work together, and responsibility (Brownlee, 2020; Glassdoor, 2021; Herrity, 2023). The trend can be related to the German work ethic which focuses on rationality, high discipline, hard work, orientation towards material success, thrift, and saving (Weber, 1992).

Personal success, social relations, and work require an ethic that focuses on interpersonal skills to read opportunities and chances, have the initiative in a job, and be reliable in any situation. This was confirmed by the result of previous research that low work ethic caused the poverty of fishermen despite abundant maritime resources, leading to a low Need for Achievement (N Ach), a key factor in socio-economic development (McClelland, 1961). There is a need for significant achievement, mastery of skills, and high standards to express preferences for certain outcomes affiliated with the cultural mission. Furthermore, reformer figures are needed to change psychological problems hindering social change in society (Lerner, 1958). Even though the theory referenced is old, it is in line with the explanation of the phenomenon of poverty where economic prosperity is not solely triggered based on external stimulus but is more determined by the work ethic and mentality of the community.

Laziness, resignation, apathy, working instinctively and without initiative as well and giving up easily were found to be the work ethic that led to the lack of improvement in socio-economic life. This was observed from the fact that poverty persisted among small-scale fisheries even though several external stimuli such as food and non-food assistance were provided in the form of subsidies, knowledge and skills transfer through workshops and empowerment. Without continuous improvement in internal conditions such as good work ethic and mentality, poverty can undoubtedly be reduced. The most basic points required are attitude, determination, and dedication as well as responsibility for tasks and work.

The working conditions around marine fisheries require adopting a hardworking, disciplined, diligent, initiative, material-oriented, and thrifty work ethic to ensure the placement of high value on material and professional success. People with these attributes demonstrate moral principles and ideal lifestyles to improve their abilities towards influencing the surrounding environment positively. This shows that the fishermen need to have work motivation, understand the necessity of hard work and strong character, and become reliable, dedicated, and disciplined, as well as ensure continuous improvement of quality. All the attributes identified as the pathway to reduce poverty and become more prosperous. The trend shows that, compared to external stimuli, internal factors are both preconditions and determinants of socio-economic improvement. Therefore, this research concludes that a high work ethic is the main key to transitioning from normal and extreme poverty to improving the socio-economic conditions needed to be more prosperous.

4. Conclusion

In conclusion, a high work ethic requires that the fishermen understand the quality of being self-motivated and fully aware of the hard work and strong character needed to perform their job. This could be achieved through the adaptation of hardworking, disciplined, diligent, initiative, material-oriented, and thrifty ethics around the marine fisheries environment. The fishermen were required to exhibit moral principles as hard workers, lead ideal lifestyles to improve their abilities and have a good impact on the surrounding environment. Therefore, the ethics considered suitable for the research area were determination and dedication, valuable soft skills, moral principles, strong character at work, implementation of positive values to increase work capacity, positioning in every job, reliability, discipline, and responsibility. In the future, similar research is needed, specifically to foster and develop a work ethic for small-scale fisheries to avoid laziness, apathy, giving up easily, lack of initiative, and working instinctively.

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The Impact of Macroeconomic Factors on the Volatility of Tin Commodity Futures Contract Prices: Empirical Study on Inflation, Interest Rates, and Forward Prices

Shendy Amalia¹, Kharisya Ayu Effendi², Suskim Riantani³

^{1,2,3} Faculty of Economics and Business, Widyatama University, Bandung, Indonesia

Abstract

This research explores the impact of macroeconomic factors on the volatility of tin commodity futures contract prices, with a focus on inflation, interest rates and forward prices. The volatility of tin futures prices is important to investment strategies and risk management. Understanding the influence of these macroeconomic variables helps in making better investment decisions. The independent variables analyzed include inflation (X1), interest rates (X2), and forward prices (X3). Inflation reflects general price increases that can increase production costs and affect commodity prices. Interest rates are borrowing costs that influence investment decisions through the cost of capital. Forward prices reflect market expectations of future commodity prices. The dependent variable is the volatility of the tin commodity futures contract price (Y). This research methodology uses linear regression to analyze historical data from the three macroeconomic variables. Data is collected from economic reports, financial market data, and government publications. Analysis is carried out to determine the influence of each variable on futures price volatility. The research results show that inflation and forward prices have a significant influence on the volatility of tin futures contract prices, while interest rates have no significant influence. Increased inflation leads to increases in production costs and prices of goods, increasing future price uncertainty and volatility. High forward prices reflect expectations of future increases in commodity prices, which also increases volatility. Meanwhile, interest rates do not significantly affect borrowing costs, so they have no impact on futures contract price volatility.

Keywords: Price Volatility, Futures Contracts, Tin Commodities, Inflation, Interest Rates, Forward Prices

1. Introduction

1.1 Introduce the Problem

Futures Contract Agreements carry the potential for profits in line with increasing price changes. Conversely, the associated risk of loss is also in line with the decline in the price of the Futures. A futures contract is an agreement between two parties who agree to carry out a sale and purchase transaction for a number of assets or commodities at a future date. Thus, these contracts allow market participants to hedge against unexpected price fluctuations in the future, as well as providing speculators with the opportunity to take advantage of anticipated price movements. Initially, Futures contracts were usually related to trading agricultural or mining commodities. However, along with the development of financial markets, the scope of Futures contracts has expanded to include financial assets such as interest rates, market price indices and foreign currencies (Tandelilin, 2001:298). This expansion reflects

the dynamics and complexity of modern markets which are increasingly global and integrated. Futures contracts create opportunities for the parties involved to manage price risks that may occur in the future. Gains or losses from these contracts are directly related to changes in the value of the asset or commodity that is the subject of the contract. In this context, market participants can use Futures contracts to protect themselves from adverse price fluctuations or to speculate on profitable price movements. For example, a wheat farmer may sell a Futures contract to lock in the future selling price of his wheat, thereby protecting himself against a potential sudden drop in the market price of wheat.

Initially, Futures contracts were usually related to trading agricultural or mining commodities. However, as financial markets have developed, the scope of Futures contracts has expanded to include financial assets such as interest rates, market price indices and foreign currencies. This expansion reflects the dynamics and complexity of modern markets that are increasingly global and integrated (Hull, J. C. (2017)). Thus, Futures contracts not only function as a hedging tool for commodity producers and consumers, but also as an important investment instrument for various financial entities, from banks to hedge funds, who are looking for ways to manage risk and maximize returns in volatile markets.

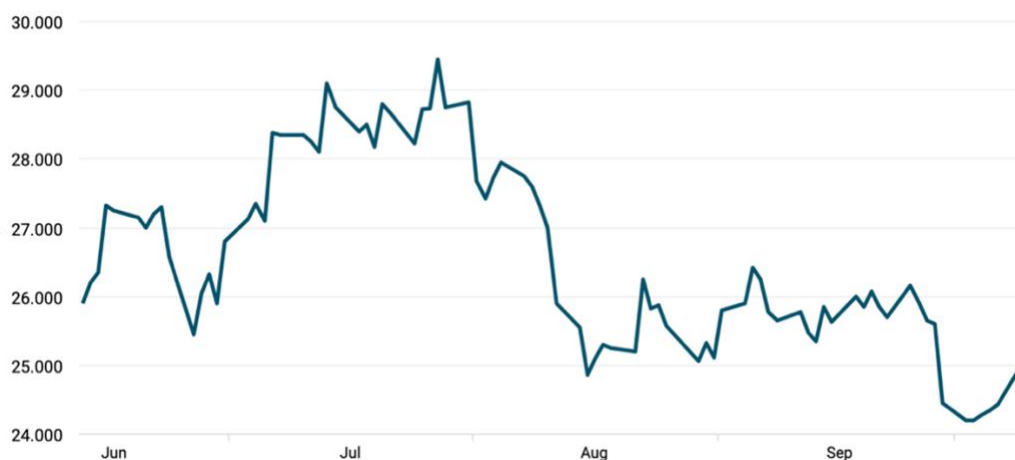


Table 1.1: Tin Commodity Price

In the chart above, we can see that the three-month contract price of tin is currently showing an upward trend. Data monitored by Westmetall on Monday, 09 October 2023, indicated that the three-month contract price for tin commodities had reached US\$25,000 per ton. Although there was a decline in trade in tin products of 0.79% since the beginning of the year, overall, this product experienced a decline of 0.75% on an annual basis. The highest peak price for tin commodities during 2023 occurred on January 27, reaching US\$32,100 per ton. The average price throughout this year, especially in the period January to October 2023, is around US\$26.28 thousand per ton. This price experienced a significant decrease of 15.12% or the equivalent of US\$-4,680.26 per ton compared to the previous year's average. This decline reflects the market pressure faced by tin commodities amidst various global economic factors that influence demand and supply.

This data provides an overview of the dynamics of tin commodity prices during 2023 and reflects the challenges and opportunities that market players may face in managing their investments. Information regarding price fluctuations is important for investors and entrepreneurs to carry out appropriate hedging and speculation strategies, so that they can optimize profits and minimize risks in trading tin commodities.

Based on previous research, there are five variables that influence futures contracts, such as spot prices and forward prices (Yanti & Artini, 2013), inflation, interest rates (Dewi, Siregar, Hartoyo, & Manurung, 2011b), and the government bond index (Pramasha & Widyarti, 2015). In conditions of limited supply and constant or increasing

demand, spot prices tend to rise, which also influences futures prices to increase along with increases in spot or cash prices. Wesso (1999) indicates that spot prices have a role as the best predictor for projecting futures prices, with a significant positive correlation to futures price predictions.

In this research, inflation is also identified as one of the main factors influencing futures contract prices. Fluctuations in the Consumer Price Index (CPI), triggered by the dynamics of demand and supply of goods, significantly influence price movements in the market. In this context, inflation is an important consideration because of its broad impact on the value of a country's currency, which directly influences global prices of goods, including commodities such as Tin. When the inflation rate increases, the rupiah exchange rate tends to depreciate, which then results in lower commodity prices such as tin, causing futures contract prices to fall as found in previous research (Dewi et al., 2011).

Inflation is a phenomenon where prices as a whole experience a continuous increase over a certain period of time. Inflation can occur due to an even increase in prices and can be triggered by an increase in public consumption, and excess liquidity in the market which causes an increase in raw material prices, which in turn will raise the price of futures contracts (Pramasha & Widyarti, 2015). A similar opinion was expressed by Adam et al. (2018), which states that inflation has a positive significance on spot futures. However, Pramasha & Widyarti (2015) argue that there is a negative influence between inflation and olein commodity futures contracts. Meanwhile, Dewi et al. (2011) stated that inflation does not significantly affect the gold index rolling contract.

Apart from that, other investment instruments that also have the potential to influence futures contract prices include interest rates. When interest rates rise, investors' tendency to save increases, which has the potential to reduce demand for futures contracts, so that futures contract prices tend to decrease, in accordance with findings in previous research (Dewi et al., 2011b). The negative relationship between interest rates and futures contract prices is supported by the findings of Dewi et al. (2011b), which states that interest rates have a negative and significant impact on futures contracts. However, a different opinion was expressed by Dewi et al. (2011a), which states that interest rates have a positive impact on olein futures contracts. Apart from that, a different approach was also expressed by Adam et al. (2018), which states that interest rates do not have a significant impact on futures contracts.

After interest rates in theory, forward prices and futures prices have a close relationship and influence each other, especially in commodity markets such as tin. The forward price is the currently agreed price for a transaction to be executed in the future, while the futures price is the price of an exchange-traded contract for future delivery. In the context of the tin commodity, forward prices are used to lock in the purchase or sale price of tin in the future, thereby providing protection against price fluctuations. For example, tin producers can use forward contracts to ensure a certain sales price in the future, which helps them plan revenue and manage price risk (Jens Wimschulte, 2010).

On the other hand, futures prices reflect market expectations of future tin prices, including factors such as supply and demand, interest rates, and global economic conditions. Because futures are traded on exchanges, they offer higher liquidity and price transparency compared to more customized forward contracts traded over-the-counter (OTC) (CFA Institute). In theory, forward and futures prices tend to be highly correlated because they both depend on the underlying spot price and the same fundamental factors. However, differences in trading mechanisms and transaction fees may cause price differences between the two. For example, futures often involve margins that traders must maintain, which can affect price dynamics (CME Group).

Thus, in the context of the tin commodity market, understanding the interaction between forward prices and futures prices is very important for market players to manage risk and make better investment decisions. Based on the phenomenon of fluctuations in tin commodity prices which show different movement trends from futures contract prices, as well as variations in the results of previous research, the aim of this research is to investigate the impact of forward prices, inflation, interest rates on futures contracts on tin commodities. This research is aimed at providing deeper insight, so that investors and hedgers can consider optimal and appropriate investment policies.

1.2. Inflation

According to Fisher, inflation can be explained as a condition in which there is a general and continuous increase in the prices of consumer goods in all economic sectors. Fisher underlined the aspect of price increases that are evenly distributed across all economic sectors, including goods consumed by people on a daily basis.

Friedman defines inflation as "a monetary phenomenon that occurs when the money supply in an economy exceeds the production capacity of goods and services, ultimately causing a general increase in prices." Friedman is famous for his view that inflation is always and everywhere a monetary phenomenon.

Apart from that, inflation is a situation where prices experience continuous increases (Rosyidi, 2009: 131). This refers to a situation where price increases occur simultaneously in various sectors of the economy. To measure inflation, you can use the general quantity of goods and services, and calculate the average price over several time periods (Case & Fair, 2007:57). Bank Indonesia (2018) sets the Consumer Price Index (CPI) as the main indicator for assessing the level of inflation. Changes in the CPI reflect price movements based on people's consumption of various goods and services. The inflation rate is measured in the form of a percentage change in the CPI announced by Bank Indonesia every month. This shows proportional changes in prices of various products consumed by the public, providing an overview of the inflationary pressures currently occurring in the economy.

Inflation is usually measured using the Consumer Price Index (CPI). The formula for calculating the inflation rate is as follows:

$$\text{Inflation Rate} = \left(\frac{\text{CPI}_{\text{current year}} - \text{CPI}_{\text{previous year}}}{\text{CPI}_{\text{previous year}}} \right) \times 100 \dots\dots\dots(1)$$

1.3. Interest Rates

According to Kasmir (2014: 114), interest can be interpreted as a cost that must be borne by customers to the bank that sells their products, as well as a payment that must be made by customers who take out loans from the bank. Deposit interest and loan interest are two forms of interest applied, where deposit interest functions as an attraction for customers to buy savings products at the bank, while loan interest is an obligation that must be fulfilled by customers in return for the loans they receive.

In his book "The Economics of Money, Banking, and Financial Markets," Mishkin explains that an interest rate is the price paid to borrow money, usually expressed as a percentage of the loan amount. Interest rates influence investment and consumption decisions and have a significant impact on the overall economy.

Meanwhile, Fisher developed the concept of "Quantity Theory of Money" which explains that nominal interest rates consist of real interest rates plus the anticipated inflation rate. According to Fisher, real interest rates are nominal interest rates that have been adjusted for inflation.

The reference interest rate issued by the government for each bank, such as the BI 7-day (Reverse) Repo Rate, is a macroeconomic instrument that determines interest rates. The BI 7-day (Reverse) Repo Rate published by Bank Indonesia every month is a benchmark for measuring interest rates in banking activities.

The general formula for calculating interest is as follows:

$$\text{Interest (I)} = \text{Principal (P)} \times \text{Rate (R)} \times \text{Time (T)} \dots\dots\dots(2)$$

1.4. Forward Price

Forward prices refer to the sale and purchase agreement of the underlying asset that will occur at a point in time in the future. This agreement is determined at the time of the underlying buying and selling transaction, and the forward price is the price in effect when the agreement occurs. In the process, the forward contract does not require payment in cash until the asset is delivered.

In his book "Options, Futures, and Other Derivatives," Hull defines a forward price as the price agreed to in a forward contract to buy or sell a specific asset at a specific date in the future. This price is determined based on the current spot price, financing costs, and holding costs, as well as any profits or other carry benefits associated with the asset.

Forward contracts are designed with the hope of eliminating trust risk between the parties involved, thereby minimizing potential uncertainty. The forward price is based on the value stated in the forward contract itself. In the context of tin commodities, forward prices use changes in the forward price of tin commodities on the London Metal Exchange (LME).

The formula for changes in forward prices, as explained by Hull (year), can be calculated using the formula:

$$Forward = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\% \dots\dots\dots(3)$$

Where :

- Forward = change in Forward price in month t
- Pt = Forward price of the t-th period
- Pt-1 = Forward price for period t-1

1.5. Commodity Futures Contract (Tin)

In his book "Options, Futures, and Other Derivatives," Hull defines a futures contract as a standardized agreement to buy or sell a commodity or financial asset at a specified price in the future. These contracts are traded on exchanges and have standard specifications regarding the quantity, quality and delivery date of the commodity in question (Hull, 2017).

According to Bodie, Kane, & Marcus (2014: 172), a commodity futures contract is an agreement that regulates the process of sending commodities at maturity at an agreed price for payment on the contract's maturity date. A futures contract is an agreement between a seller and a buyer regarding a number of assets or commodities. Futures sellers and buyers agree to sell and buy a certain amount at a predetermined price and within the time limit agreed in the contract (Tandelilin, 2001:298).

The futures price is the price announced by the futures exchange at a certain time. This price is formed based on investors' expectations of commodity supply and demand. Every day, futures prices are announced on the settlement date by the exchange. Futures prices are measured by monitoring changes in end-of-month data on the Indonesian Commodity and Derivatives Exchange (BKDI). Changes in futures contracts can be calculated using formula (1) as follows.

$$Futures = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\% \dots\dots\dots(4)$$

Information:

Futures = change in futures price in month t
Pt = Futures price for period t
Pt-1 = Futures price for period t-1

2. Research Methods

This research focuses on testing specific hypotheses and analyzing information relationships in the context of conclusive causality research. In obtaining evidence regarding the influence of independent variables such as forward prices, inflation and interest rates on the dependent variable, namely tin commodity futures contracts, researchers used quantitative data. The secondary data used comes from various trusted sources such as the Indonesian Commodity and Derivatives Exchange (www.icdx.co.id), BAPPEBTI (www.bappebti.go.id), London Metal Exchange (www.lme.com), Bank Indonesia (www.bi.go.id), and the Indonesian Securities Price Appraiser (www.ibpa.co.id), ensuring the accuracy and reliability of the analysis carried out. With this approach, this research aims to provide a deeper understanding of the dynamics of the tin commodity market and the factors that influence it empirically.

This research also takes into account the forward contract price factor as one of the independent variables that have the potential to influence tin commodity futures contracts. Through the use of quantitative data from various sources mentioned previously, researchers strive to produce comprehensive and accurate analysis. Thus, the research results are expected to provide a significant contribution to the understanding of the dynamics of the tin commodity market and the factors that influence it empirically, as well as providing valuable guidance for market players and policy makers.

The population considered in this research is tin commodity futures contracts at the settlement date on the Indonesian Commodity and Derivatives Exchange from 2019 to 2023. The analytical method applied in this research is multiple linear regression analysis, which aims to explore how strong the relationship between two or more variables and indicates the direction of the relationship between the dependent variable and the independent variable. To carry out this analysis, SPSS version 18 software was used. Before testing the hypothesis, the validity of secondary data was tested by testing classical assumptions. Some of the classic assumptions tested include normal data distribution, absence of multicollinearity, absence of autocorrelation, and absence of heteroscedasticity.

3. Research design

This research uses a conclusive causality research design to test the relationship between the independent variables (forward prices, inflation, interest rates, and forward contract prices) and the dependent variable (tin commodity futures contracts). This design was chosen because it allows researchers to evaluate causation between the variables studied. With this approach, research can identify the direct influence of independent variables on dependent variables, making it possible to understand more deeply the mechanisms underlying the relationship between economic factors and market behavior of tin commodities. In addition, conclusive causality designs also allow researchers to make stronger conclusions about cause-and-effect relationships than other research designs, so that research results can make more significant contributions to scientific understanding and practical applications in the fields of economics and finance.

3.1. Population and Sample

The population in this research is all tin commodity futures contracts at the settlement date on the Indonesian Commodity and Derivatives Exchange from 2019 to 2023. The research sample was taken purposively from this population by paying attention to the predetermined inclusion criteria. In sampling, researchers considered inclusion criteria such as the availability of complete and accurate data for the period studied and relevance to the research objectives. By selecting samples purposively, it is hoped that the research results can represent the

population as a whole and provide better generalizations about the phenomenon being studied. Additionally, the use of samples that reflect variations in the population can also increase the external validity of research findings.

3.2. Research variable

The research variables in this study consist of dependent variables and independent variables which are the focus of the analysis. The dependent variable used is the price of the tin commodity futures contract, which is a variable that will be influenced by other independent variables. The price of the tin commodity futures contract was chosen as the dependent variable because it is an important measure of tin commodity market performance and is the main focus of this research analysis.

Meanwhile, the independent variables used include forward prices, inflation, interest rates and forward contract prices. The forward price is the agreed contract price for the purchase or sale of an asset in the future, which has the potential to influence the price of the tin commodity futures contract. Inflation and interest rates were chosen as independent variables because they are known to have a significant impact on the prices of financial assets including futures contracts. Meanwhile, the forward contract price is considered as an independent variable because it has a close relationship with the futures contract price and may influence the overall dynamics of the tin commodity market.

By paying attention to the relationship between the dependent variable and the independent variables studied, this research aims to identify and analyze the influence of each independent variable on the price of tin commodity futures contracts.

3.4. Data Collection Instruments and Techniques

The instruments and data collection techniques in this research rely on secondary data obtained from several trusted sources. Main data sources include the Indonesian Commodity and Derivatives Exchange (www.icdx.co.id), BAPPEBTI (www.bappebti.go.id), London Metal Exchange (www.lme.com), Bank Indonesia (www.bi.go.id), and Indonesian Securities Price Appraiser (www.ibpa.co.id). The use of secondary data from these sources was chosen because of its reliability in providing information related to tin commodity futures contracts and other independent variables relevant to this research.

The data collection process is carried out through direct access to websites and databases provided by these sources. The information obtained includes historical data on tin commodity futures contract prices, forward price data, inflation data, interest rate data, and forward contract price data within the time period specified for this research. Data collection was carried out carefully to ensure the completeness and accuracy of the data obtained. Apart from that, researchers also ensure that the data collection process is carried out by paying attention to the policies and regulations that apply to the use of secondary data from each source. This is done to ensure compliance with ethical standards and integrity in the use of data and to maintain the credibility and validity of research results.

3.5. Data analysis method

The data analysis method used in this research is multiple linear regression. Multiple linear regression is a statistical technique that allows researchers to understand the relationship between one dependent variable and two or more independent variables. In the context of this research, multiple linear regression is used to test the relationship between independent variables, such as forward prices, inflation, interest rates, and forward contract prices, with the dependent variable, namely the price of tin commodity futures contracts.

Multiple linear regression analysis aims to measure how strong the relationship is between the independent variable and the dependent variable, as well as determining how much influence the independent variable has on the dependent variable. By using this technique, researchers can evaluate whether there is a significant relationship between the variables under study, and in what direction the relationship moves.

Data processing and analysis were carried out using the Statistical Package for the Social Sciences (SPSS) software version 18. SPSS is a software that is widely used in statistical data analysis because of its strong ability to process data efficiently and provide reliable analysis results. . By using SPSS, researchers can carry out various types of statistical analysis, including multiple linear regression, in a systematic and standardized way.

3.6. Data Validity and Reliability

Data validity and reliability are important steps in ensuring that the analysis results produced from secondary data are reliable and have accurate interpretations. Before conducting hypothesis analysis, this research tested the validity of secondary data by checking classic assumptions which include normal data distribution, absence of multicollinearity, absence of autocorrelation, and absence of heteroscedasticity.

First, the study checks the distribution of the data to ensure that the data follows a distribution that is close to normal. The normal distribution is important because most statistical methods require assumptions about normal distribution in the data. Furthermore, the study also evaluated multicollinearity, which refers to the existence of high correlation between two or more independent variables. Multicollinearity can interfere with the interpretation of regression analysis results, so it is important to check whether this occurs in the data.

In addition, the study examined the possibility of autocorrelation, that is, correlation between consecutive values in the data. Autocorrelation can occur in time series data and can affect the accuracy of parameter estimates in regression models. Finally, the study examined heteroscedasticity, which indicates that the variance of the error of the regression model varies across the range of values of the independent variables.

By examining these classic assumptions, research can ensure that the secondary data used in the analysis has high validity and reliability. This provides greater confidence in the analysis results produced and ensures that the conclusions drawn from this research can be methodologically justified.

3.7. Research Model

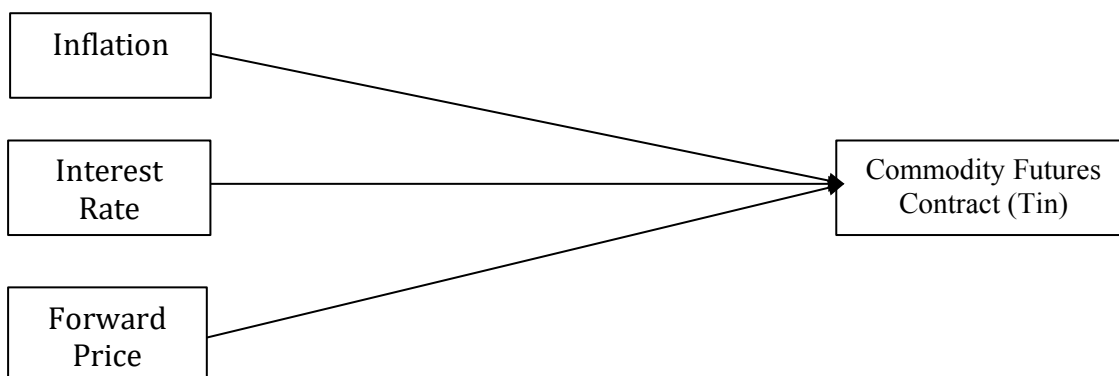


Table 3.1: Research Model

From this research model, the following research hypothesis can be drawn:

H1 : There is a significant relationship between the inflation rate and the price of tin commodity futures contracts.

H2 : There is a significant relationship between interest rates and the price of tin commodity futures contracts.

H3 : There is a significant relationship between the forward price and the price of the tin commodity futures contract.

H4 : There is a significant relationship between the inflation rate, interest rates and forward prices on the futures contract price for the tin commodity.

3.8. Variable Operational Table

No	Variable	Variable Concept	Formula
2.	Forward Price	The forward price is the agreement value to buy or sell an asset at a certain time in the future. This agreement includes the price agreed upon when the transaction is made, and the concept is related to forward contracts in financial markets. (Hull, J. C. 2001).	$Forward = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\%$
3.	Inflation	A condition in which there is a general and continuous increase in the prices of consumer goods in all economic sectors. (Fisher, 1930)	$Inflation\ Rate = \left(\frac{CPI_{current\ year} - CPI_{previous\ year}}{CPI_{previous\ year}} \right) \times 100$
4.	Interest Rates	The interest rate is the price or cost that must be paid or received in relation to the use of money, whether in the form of loans or savings. This interest rate reflects a percentage of the amount of money involved and is often measured over a certain period of time, such as annually. (Fisher, 1930)	$Interest\ (I) = Principal\ (P) \times Rate\ (R) \times Time\ (T)$
5.	Commodity Futures Contract (Tin)	A commodity futures contract is an agreement that regulates the purchase or sale of a commodity in the future at a predetermined price. The contract involves obligations for both parties, buyer and seller, to carry out transactions in the future, in accordance with the agreed terms. (Hull, J. C.2001).	$Futures = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100\%$

4. Research Result

4.1. Normality test

The results of the normality test using the Kolmogorov-Smirnov method show that the data distribution for all research variables, including forward prices, inflation, interest rates, forward contract prices, and tin commodity futures contract prices, does not meet the normal distribution assumption at the 5% significance level ($p < 0.05$). This shows that the data used in this research is not normally distributed. The implication of these normality test results is that parametric statistical analyzes that require the assumption of a normal distribution may not be appropriate for use in the context of these data. Instead, non-parametric alternatives or data transformations may need to be considered to ensure the accuracy of the analysis results. However, it is important to remember that research results and their interpretation should be approached with caution and may require careful consideration regarding the limitations of this non-normal data distribution.

Table 4.1: Normality test

	Unstandardized Predicted Value	
Asymp. Sig. (2-tailed) ^c		.200 ^d
Monte Carlo Mr. (2-tailed) ^{lt is}	Say.	.662
99% Confidence Interval	Lower Bound	.650
	Upper Bound	.674

In this table, the Asymp value is obtained. Sig. (2-Tailed) = 0.200 > 0.05.

So it can be concluded that the residuals are normally distributed.

4.2. Heteroscedasticity Test

The heteroscedasticity test is part of the classic assumption test in linear regression analysis. The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residual value of one observation to another observation. In a linear regression analysis, the expected assumption for the parameter estimation method to be BLUE (Best Linear Unbias Estimator) is to have the same/homogeneous residual (error) value, commonly known as Homoscedasticity. In a linear regression analysis, heteroscedasticity (different residual/error variance) should not occur. One way to find out whether there is heteroscedasticity in a multiple linear regression model is by looking at the scatterplot graph of the predicted value of the dependent variable, namely SRESID, with the residual error, namely ZPRED. If there is no particular pattern and it does not spread above or below zero on the y-axis, then it can be concluded that heteroscedasticity does not occur. Apart from using scatterplot graphs, heteroscedasticity testing can also be done using the Glejser Test.

Table 4.2: Heteroscedasticity Test

	t
(Constant)	28.363
Inflation	-3.656
Tribe_Flowers	-.094
Price_Forward	2.464

From the Coefficients Table the following conclusions can be obtained:

In the Inflation Variable, the Sig value is obtained. = 0,178 > 0,05
 In the Interest Rate Variable, the Sig value is obtained. = 0,928 > 0,05
 In the Forward Price Variable, the Sig value is obtained. = 0,443 > 0,05
 In conclusion, there is no heteroscedasticity.

4.3. Autocorrelation Test

A good regression model is a regression model that is free from autocorrelation.

In the classical assumption, autocorrelation is a correlation that occurs between errors/residuals in a certain period (eg t) and errors/residuals in other periods. The autocorrelation problem causes the variance formed in the simple linear regression model to not be minimal. Autocorrelation generally occurs because data in one period is influenced by data in other periods. For example, the rupiah exchange rate today is influenced by the rupiah exchange rate on the previous day.

The autocorrelation assumption is only tested on time series data or cross-sectional data which has a standard sequence pattern between observations. To find out whether there is autocorrelation, you can look at the Durbin Watson value.

The Durbin-Watson test (DW test) uses the following provisions or basis for decision making:

First determine the hypothesis, with the null hypothesis (H0) namely there is no autocorrelation and the alternative hypothesis (H1) namely there is autocorrelation.

- If the DW value < dL or DW > 4-dL

then the null hypothesis is rejected, which means there is autocorrelation.

- If the DW value lies between dU and 4-dU, namely $dU < DW < 4-dU$ then the null hypothesis is accepted, which means there is no autocorrelation.

- If the DW (Durbin Watson) value lies between dL and dU , namely $dL < DW < dU$ or if $4-dU < DW < 4-dL$, then it does not produce a definite conclusion.

Table 4.3: Autocorrelation Test

Model Summary	
Model	Durbin-Watson
1	1.822

From the Durbin Watson Table (5% real level), with $n = 40$ and the number of independent variables (k) = 3, it is obtained that $dL = 1.6000$ and $dU = 1.3384$

The Durbin Watson (DW) value = 1.822 is between dU and $4 - dU$.

$dU < DW < 4 - dU$

$1,3384 < 1.822 < 4 - 1,3384$

$1,3384 < 1.822 < 2,6616$

It can be concluded that there is no autocorrelation.

4.4. Multicollinearity Test

Multicollinearity means that the independent variables contained in the regression model have a linear relationship that is close to perfect (the correlation coefficient is high). A good regression model should not have high correlation between the independent variables. There are several multicollinearity test methods, namely:

- By comparing the individual coefficient of determination (r^2) with the simultaneous determination value (R^2).
- By looking at the Variance Inflation Factor (VIF) and Tolerance values in the regression model. Ways to determine whether or not there are symptoms of multicollinearity include looking at the Variance Inflation Factor (VIF) and Tolerance values. If the VIF value is less than 10 and Tolerance is more than 0.1, it is stated that multicollinearity does not occur.

Table 4.4: Multicollinearity Test

Collinearity Statistics	
Tolerance	VIF
.439	2.276
.439	2.276
.439	2.276

In the table above, the VIF value is $2,276 < 10$, so it is stated that multicollinearity does not occur.

4.5. Multiple Linear Regression Analysis

Multiple linear regression analysis is a statistical technique used to test and model the relationship between one dependent variable and two or more independent variables. The main objective of this analysis is to understand how the independent variables together influence the dependent variable, as well as to identify the contribution of each independent variable in predicting the value of the dependent variable.

The multiple linear regression model is expressed in equation form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon$$

4.6. SPSS Output and Analysis

4.6.1. Descriptive statistics

Table 4.6.1: Descriptive Analysis

Descriptive Statistics		
	Mean	Std. Deviation
Price_Futures	16018.18	251.270
Inflation	40.218	237.172
Tribe_Flowers	120.255	140.218
Price_Forward	20505.00	4.950.941

- 1) Average inflation is 40,218 with a standard deviation of 237,172.
- 2) The average interest rate is 120,255 with a standard deviation of 140,218
- 3) The average Forward Price is 20505 with a standard deviation of 4,950,941
- 4) The average Futures Price is 16018 with a standard deviation of 251,270

4.6.2. Regression Model Fit Test (F Test)

The model suitability test (model feasibility test) or what is more popularly known as the F test is the initial stage of identifying a regression model that is estimated to be suitable for use or not. Feasible here means that the regression model is suitable to be used to explain the influence of the independent variable on the dependent variable. The name of this test is called the F test, because it follows the F distribution whose test criteria are like One Way Anova.

Table 4.6.2: Uji F

ANOVA			
Model		F	Sig.
1	Regression	9.654	.003
	Residual		

Sig value. in the table above it is $0.003 < 0.05$ (the level of significance used). It can be concluded that the linear regression model is suitable to be used to explain the influence of inflation, interest rates and forward prices on futures prices for tin commodities.

4.6.3. Regression Coefficient Test (t Test)

The t test in linear regression is intended to test whether the parameters (regression coefficients and constants) to estimate the linear regression equation/model are the correct parameters or not. In other words, whether these parameters are able to explain the behavior of the independent variable in influencing the dependent variable. The parameters estimated in linear regression include the intercept (constant) and slope (coefficient in the linear equation).

Table 4.6.3: Uji t

Coefficients		
Model		Sig.
1	(Constant)	.000
	Inflation	.008
	Tribe_Flowers	.928
	Price_Forward	.043

- 1) In this table, the sig value is obtained. amounting to $0.008 < 0.05$ on the Inflation variable. It can be concluded that the Inflation variable has a significant effect on the Futures Contract variable.

2) In this table, the sig value is obtained. amounting to $0.928 > 0.05$ in the Interest Rate variable. It can be concluded that the Interest Rate variable has no significant effect on the Futures Contract variable.

3) In this table, the sig value is obtained. amounting to $0.043 < 0.05$ in the Forward Price variable. It can be concluded that the Forward Price variable has a significant effect on the Futures Contract variable.

4.6.4. Coefficient of Determination

The coefficient of determination explains the variation in the influence of the independent variable on the dependent variable. It can also be said to be the proportion of influence of the independent variable on the dependent variable. The coefficient of determination value can be measured by the Adjusted R Square value.

Table 4.6.4: Coefficient of Determination

Model Summary	
Model	Adjusted R Square
1	.722

The Adj R Square value = 0.722, meaning that the contribution of the Inflation, Interest Rate and Forward Contract variables to the Futures Contract variable is 72.2%, while the remaining 28.8% is influenced by other variables not examined in this research. In other words, 72.2% of variations in Inflation, Interest Rates and Forward Contracts can be explained by variations in Futures Contracts.

4.6.5. Regression Equation or Regression Model

Table 4.6.5: Regression Equation or Regression Model

Coefficients		
Model		Unstandardized Coefficients
		B
1	(Constant)	15.861.336
	Inflation	-72.889
	Tribe_Flowers	-3.592
	Price_Forward	.024

Based on the Coefficients Table above, you can pay attention to the unstandardized coefficients column B, to prepare the following simple linear regression equation:

$$KF = 15.861.336 - 72.889 \text{ INF} - 3.592 \text{ SB} + 0,024 \text{ HF}$$

Where :

KF = Futures Contract

INF = Inflation

SB = Interest Quarter

HF = Forward Contract Price

- The regression coefficient for inflation is $-72,889$
The regression coefficient is negative, meaning that when inflation falls, the Futures Contract will experience an increase.
A decrease in inflation by 1 unit will increase the Futures Contract by 72,889
- The regression coefficient for interest rates is -3.592
The regression coefficient is negative, meaning that when interest rates fall, futures contracts will increase.
A decrease in Interest Rates by 1 unit will increase the Futures Contract by 3,592
- The regression coefficient for Forward Contracts is 0.024

The regression coefficient is positive, meaning that when the Forward Contract rises, the Futures Contract will experience an increase.

An increase in the Forward Contract by 1 unit will increase the Futures Contract by 0.024

5. Conclusions and Recommendations

5.1. Conclusion

Based on the results of data analysis and testing carried out in this research, several main conclusions can be drawn. First, from the results of the F Test, it is known that the significance value (Sig.) is 0.003, which is smaller than the significance level used (0.05). This shows that the linear regression model applied in this research is suitable to be used to explain the influence of independent variables, namely inflation, interest rates and forward prices, on the price of tin commodity futures contracts. This model can be relied on to analyze and predict the influence of these three independent variables on the price of tin commodity futures contracts.

Furthermore, the t test results show that the inflation variable has a significance value of 0.008, which is smaller than 0.05. This means that inflation has a significant effect on the price of tin commodity futures contracts. Thus, it can be concluded that an increase in inflation tends to influence the increase in the price of tin commodity futures contracts. On the other hand, the interest rate variable has a significance value of 0.928, which is greater than 0.05. This shows that interest rates do not have a significant influence on the price of tin commodity futures contracts in this study. Meanwhile, the forward price variable has a significance value of 0.043, which is smaller than 0.05, indicating that the forward price has a significant influence on the price of the tin commodity futures contract.

From the analysis of the coefficient of determination, the Adjusted R Square value of 0.722 indicates that 72.2% of the variation in tin commodity futures contract prices can be explained by variations in inflation, interest rates and forward prices. The remaining 28.8% is influenced by other variables not examined in this research. This indicates that the linear regression model used in this research is quite strong in explaining the relationship between these variables.

5.2. Suggestion

Based on the conclusions outlined, there are several suggestions that can be given for further research as well as practical implications. First, for further research, it is recommended to consider other variables that might influence the price of tin commodity futures contracts, such as geopolitical factors, global supply and demand, as well as government policies regarding commodity trading. By adding these variables, it is hoped that the resulting model can provide a more comprehensive and accurate explanation.

Apart from that, for market players and investors, it is important to pay attention to inflation and forward price variables when analyzing and making decisions regarding investment in tin commodity futures contracts. Considering that inflation and forward prices have a significant influence, monitoring changes in these two variables can help in anticipating futures contract price movements and optimizing investment strategies.

Finally, for policy makers, the results of this research show the importance of controlling inflation in maintaining price stability for tin commodity futures contracts. Effective policies in controlling inflation can have a positive impact on the stability of commodity markets and the economy as a whole.

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The Roles of Employer Branding on Talent Attraction: The Case of Sungroup Vietnam

Vu Nhat Linh¹, Bui Duc Tho², Do Hoai Linh², Duong Thi Hoai Nhung³

¹ The General Investigation Team of Moc Chau District Police, Vietnam

² National Economics University, Vietnam

³ Foreign Trade University, Vietnam

Correspondence: Do Hoai Linh. Email: linhdh@neu.edu.vn

Abstract

The authors aim at investigating the roles of employer branding on talent attraction in company of emerging countries with the case of Sungroup Vietnam. By using questionnaires of 300 respondents, the paper found that attracting talent is essential since finding and hiring the right individuals is an essential part of any organization's business plan and directly affects the company's future success. Without the correct personnel, a company may experience issues with low production, poor decision-making, and uninspired staff. This decision was based on the role of corporate image in human resource management, the current situation of talent competition in the period of industrialization and modernization, and the current situation of human resource management at Sun Group Vietnam. Based on these findings, recommendations were proposed to enhance the impact of employer branding on talent acquisition within the firm.

Keywords: Talent Attraction, Employer Branding, Vietnam

1. Introduction

In order to thrive and progress, firms in emerging countries must not only rely on financial resources, technology investments, competitiveness in the market, and the management capabilities of their leaders, but also prioritize the attraction and retention of people through diverse tactics and human resource policies. The struggle for talent acquisition and retention can often be more fierce than the competition for market share or business strategy. Specifically, the competition may intensify due to the involvement of multinational corporations operating in transitional countries such as Vietnam, as the country's economy becomes more integrated into the global economy through its accession to the WTO. Without proactive efforts to recruit and engage an adequate number of human resources, Vietnamese companies will encounter numerous constraints in various domains, hindering their ability to survive and prosper in an increasingly fierce competitive environment. An organization requires various resources, including financial, material, technological, and human resources, in order to operate and expand consistently. Human resources are considered to be a vital asset, especially when their value has an impact on the success or failure of a commercial company. Each individual who has had various positions inside the organization is considered part of its human resources department. They play a crucial role in developing and publicizing the organization's benefits, serving as the driving force behind the association's tasks. Human resources (HR) are the essential and significant asset for every company, playing a crucial role in the success and growth of the

organization. Human resource management is a critical concern for companies due to the essential role that human resources play. Depending on the job's demands, both managers and employees in the human resources department must possess a basic comprehension of their responsibilities and collaborate effectively to achieve the organization's overarching objectives. The leader of the organization must possess the ability to motivate and rally the personnel in order to properly accomplish this goal. Cascio (2022) asserts that individuals are responsible for the management and establishment of organizations. Organizations are reliant on individuals, highlighting the importance of people in the development of an organization. The success or failure of a firm in the marketplace is influenced by factors such as technology, financial resources, and human capital. The competition between corporations is more intense than ever, especially in the global information economy. The veracity of the aforementioned statement has been substantiated by the triumph of several enterprises, and the acquisition of talent is an imperative task that every organization must fulfill. Nevertheless, the degree of success varies among each organization. Attracting brilliant individuals to work involves the task of locating skilled persons who satisfy the employer's standards. It is the process of seeking out potential applicants, meticulously choosing them, and monitoring their progress until they meet the requirements for the job opening. Hence, in order to dominate the market, organizations must allocate resources towards acquiring resilient and top-notch human capital. Exceptional individuals unite to create a pool of high-caliber human resources; these individuals possess skills that lead to extraordinary transformations, significant advancements in business, or a competitive edge over competitors. Businesses often develop their own strategies to attract and cultivate the necessary capabilities in order to acquire the human resources required to meet the needs.

2. Literature Review

2.1. Employer Branding

The job market is highly dynamic, with active participation from both businesses and job seekers. Developing an Employer Brand for businesses has a significant role in attracting a large pool of candidates and effectively identifying top-notch candidates during the recruitment process. Employer Brand refers to the overall impression that a business creates on others, encompassing factors such as the company's working environment and culture, which contribute to establishing a stronger connection between the firm and the community. The greater the size of a corporate brand, the more it will appeal to a bigger pool of people seeking employment at the company. Employer branding encompasses the marketing and communication tactics employed by organizations to raise public recognition, namely among potential job candidates. Dutta and Bhagat assert that the concept of employer branding emerged and developed in response to the increasingly fierce competition for attracting talented individuals. Presently, the employment market has undergone significant transformations, resulting in heightened competition not just among job seekers but also among enterprises. Candidates' employment requirements are increasingly being compared, with greater emphasis placed on employers with stronger brands. Internal employees will have limited access to job openings as they prioritize a workplace with a positive culture and ample prospects for advancement. According to Srivastava and Bhatnagar (2010), social values are of utmost importance for both existing employees and prospective hiring. Employers and employees aim to establish positive working relationships during the job search process to foster a sense of belonging within the organization. Employer branding encompasses significant financial and practical aspects. However, there is currently no set strategy for attracting highly skilled individuals. The lack of emphasis on employer engagement through different social media channels is apparent. External employer branding should be founded on the prospective benefits that firms can offer their employees in terms of the work environment and other professional connections. The development of Internal employer branding relies on antecedent and causal links. The underlying assumption is that employees must ensure they consistently provide valuable labor and actively support the long-term reputation of the organization as an employer. The employer's brand image generates a causal value that benefits both parties involved. Businesses have the option to select particular criteria to enhance the value of their external employer branding. Jeganathan, Greeshma, and Auxilia (2020) assess the whole concept of internal employer branding, emphasizing the importance of individual employee accountability and the enhancement of their skills to effectively accomplish job objectives within their respective roles. Employer branding should be closely linked to marketing, public relations, and market positioning. Employers can optimize cost savings and effectively engage with the desired applicants by strategically selecting a promotion channel. Simultaneously, it is imperative to align

with the objectives of the external market to ensure that the organization remains competitive and enhances its market position. Organizations are differentiating themselves from their competitors by cultivating an attractive employer brand in order to be seen as an enticing employer by both job seekers and employees. Research has examined the significance of employer brand attractiveness. The research conducted by Berthon et al. discovered that the elements contributing to the appeal of an employer brand consist of 26 measurable criteria, which are further categorized into 5 categories. The study also aims to investigate the influence of employer brand attractiveness on the behavior, attitude, and performance outcomes of employees within the firm. The service benefit chain model developed by Heskett et al. (1994) shows that internal service quality has a direct impact on employee satisfaction, leading to higher staff retention rates and increased productivity. When employees have a strong passion for their profession, they will exert their utmost effort, resulting in optimal work performance. This, in turn, will elevate the overall service quality of the business, effectively addressing the needs of clients. Employee performance refers to the manner in which employees carry out their work, meeting or surpassing the performance standards set by the organization. It involves performing tasks in a creative and spontaneous manner, going beyond what is required, collaborating with colleagues, safeguarding the organization from potential harm, and providing suggestions for enhancing and advancing the organization. Additionally, employees act as representatives of the organization when interacting with guests. Every firm compensates its employees with salaries and bonuses based on its financial resources and talent acquisition strategies. Salaries and bonuses are crucial for employees as they provide financial support for both individuals and their families. Additionally, they serve as a metric for evaluating an individual's achievements or shortcomings. Compensating employees with a low compensation does not result in cost savings for the firm. On the contrary, it leads to increased expenditure as employees tend to perform poorly.

2.2. Talent attraction

Employers should not only establish a favorable initial impression through an effective recruitment process, but also offer competitive compensation and welfare benefits to attract skilled candidates. It goes without saying that branding should provide applicants a better idea of the company's culture, reputation, major competitive advantages, and offerings. The retention of key personnel as well as the development and upkeep of employee morale fall within the purview of talent acquisition teams. Every company should take into account the organization's track record of hiring for these jobs. Make sure the company has anticipated these challenges for jobs where it has proved challenging to find talent so that the hiring and talent acquisition process runs smoothly. Your prospects of long-term acquisition of culturally fit people are maximized by matching HR talent acquisition goals with more general corporate goals. When evaluating various skill profiles, effective talent acquisition takes a lot of time and care. Although every business processes and acquires people in a different way, talent acquisition has historically been viewed as the most significant factor in determining corporate culture and long-term growth that is for the better.

Any firm must prioritize the challenge of attracting talent. Building a professional recruiting channel is necessary for companies to draw in applicants in general and good candidates in particular as the recruitment channel is seen as a bridge between candidates and employers. The recruiter must use an outstanding and scientific hiring procedure to further enhance the company's reputation after developing empathy with the prospect in the online round. According to Shukla, recruitment agencies must establish a personal connection with applicants during the initial stage of the hiring process. Examples include calling applicants to confirm their attendance for the interview and sending a polite email to confirm that they will be there, as well as starting the interview promptly. When contacting qualified applicants, these straightforward tasks will help employers and organizations project a more somber image, which will increase the likelihood that they will accept offers to contribute to the firm. Employers must not only make a strong first impression with a competent recruiting procedure but also provide competitive pay and welfare benefits to entice qualified applicants.

2.3. Conceptual model and hypothesis development

A person's choice of a certain company is indicated by their decision to apply for a job. The internal elements of employees, such as Sincerity, joy, enthusiasm, competence, and toughness, are associated to symbolic traits.

2.3.1. Hypothesis development

Many HR professionals have to put in a lot of effort to evaluate the advantages, disadvantages, and genuine distinctions in their employer brand.

H1: Employer Brand positively affects applicants' decisions to apply for a job in Sun Group VN

People with talents in an organization are individuals that have a strong knowledge base, creative ideas, and solutions, which greatly aid in the process of generating advantages for the company. In addition, they are individuals that can inspire other workers inside the company, have a clear vision, and have the capacity to lead. Finding talented people who meet an organization's demands and any labor standards is a process called talent acquisition. One of the aspects of the company's talent acquisition strategy that requires the greatest attention is how employees are given a pay that is deserving and in line with the company's standards.

This improves their loyalty to the organization and demonstrates that the business always has their best interests in mind. Many organizations additionally implement policies like gift cards and discount vouchers to workers who utilize the company's services and goods in addition to these essential costs. It is difficult to neglect mentioning the execution of training programs, promoting professional work and skills for employees in order to have a successful policy to attract talent for organizations.

H2: Instrumental attributes are positively related to perceptions of applicants on Employer Branding

One of the things that draws people to an organization, keeps them there, and inspires them to work hard to provide as much value as they can to the enterprise is the work environment. Building a tidy, cozy, welcoming, well-designed workplace boosts staff morale and productivity. Training and development programs for employees require the optimum working atmosphere (Herzberg, 2017).

H3: Symbolic attributes are positively related to perceptions of applicants on Employer Branding.

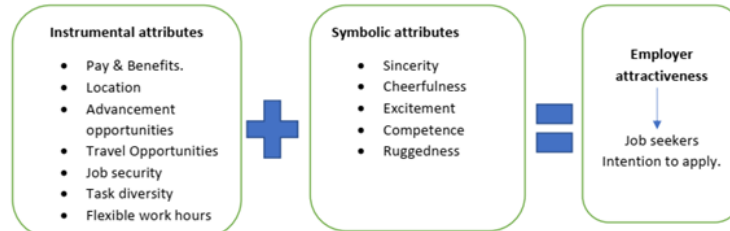


Figure 1: Employer attractiveness

Source: Compiled by author

3. Research Methodology

The philosophical approach entails questioning other people's viewpoints, and there are many discussions on pretty much everything. The foundation of the conventional philosophical approach is using numerous lenses through which to see reality. People were traditionally chosen using a distinct philosophical approach based on who you knew or who was first in line under the former employment system, according to how the selection process has traditionally been presented. The selection process is prejudiced and undervalues the applicant, thus there is a high danger of choosing the incorrect individual under that philosophical framework.

Before making a final choice, it is important to consider the notion that a person should be chosen based on their aptitudes, competencies, and performance for the specific position. This wider range of personal practice has been reflected in the evaluation of this idea. When line managers used to meet with employees annually and complete the necessary form, performance reviews were a relatively simple task for managers to complete because it was so routine. The notion of the assessment process has been accorded significant weight in this regard by the appropriate authorities.

The primary tenet of this notion is to analyze employees' performance in order to determine if they are performing their tasks correctly, whether they require more training, and whether they require any development assessments

in order to perform better. The findings of this study essentially contain additional traits common to the entire population. The research participants, who represent various objectives in their search for a reliable service provider, are merged into the overview parts. Implementation of the research design is equally useless if resources and data accessibility are inaccessible.

To complete the research paper through 8 steps:

Step 1: First, determine what the issue is. The first step is to identify an issue or create a research topic. The researcher is guided by a well stated problem through every step of the research process, from goal formulation through technique selection.

Step 2: Analyze the overall research findings. For the research process to be successful, relevant studies must be thoroughly reviewed. It enables the researcher to pinpoint the precise elements of the issue. The investigator or researcher has to understand more about the issue after it has been identified. It gives the researcher access to earlier studies, details on how they were carried out, and their findings. Through a literature review, researchers may create consistency between their own work and other works. Such an evaluation enables the researcher to access a larger body of information and enhances his ability to efficiently oversee the study procedure.

Step 3: Construct an assertion. A researcher has to be an expert in their subject in order to formulate a hypothesis. The foundation of the hypothesis should be the study subject, which is a crucial consideration for researchers. As they create theories to direct their work, researchers may concentrate their efforts and remain dedicated to their objectives.

Step 4: Create the study. The strategy for achieving the goals and responding to the study questions is called the research design. It describes where to get pertinent information. Its objective is to plan research to answer research questions, test hypotheses, and offer guidance on making decisions. The goal of study design is to reduce the amount of time, money, and effort needed to collect useful data.

Step 5: Describe the pattern. Research studies frequently focus on a certain population, a facility, or how technology is applied in industry. The phrase «population» in research refers to this subject matter. The research group is defined in part by its topic and goal.

Step 6: Collect data. In order to get the knowledge or information required to address the research challenge, data collecting is crucial. Every study gathers information, either from the literature or the subjects. There are two types of researchers from whose data must be gathered. These sources can offer first-hand information. The author used 300 research samples to gather financial report data for this study.

Step 7: Analyze the data. The data analysis is planned by the researcher as part of the study design process. The researcher evaluates the data after gathering it. In this stage, the data is compared to the strategy. Review and reporting of the study findings is done. In this phase, the author performed statistical analysis, regression analysis, and a multicollinearity test on the acquired data using the SPSS program.

Step 8: Write the report. After completing these steps, the researcher must prepare a report detailing his or her findings.

The model of this research is developed below:

H1: Employer Brand positively affects applicants' decisions to apply for a job in Sun Group VN

H2: Instrumental attributes are positively related to perceptions of applicants on Employer Branding

H3: Symbolic attributes are positively related to perceptions of applicants on.

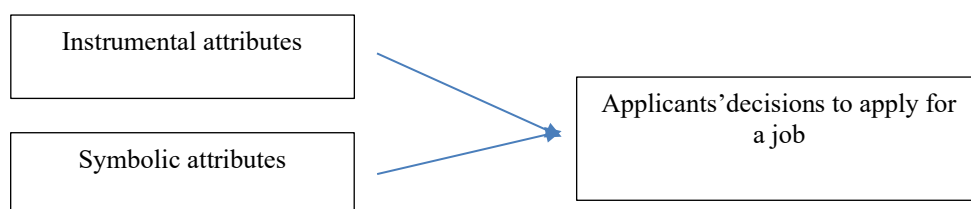


Figure 2: Conceptual framework

Source: Fombrun et al., 2000; Highhouse et al., 2003

Research subjects are employees working at Sun Group. The researcher conducted an approach to collect a total of 300 targeted survey samples. The survey aims to bring information and data for research. The researcher collects

information through the Google Form application. The researcher then proceeds to filter and arrange the data in accordance with the research. Data was collected at Sun Group Vietnam by building a questionnaire on Google Form and sent to employees who are working at Sun Group during the research period and have signed official labor contracts of Sun Group via email. As a result, 300 research samples were obtained. A quantitative research approach was adopted for the study. The researcher enters the data into the SPSS program when it has been entirely collected in order to examine and assess the outcomes of the research model. The efficiency of the research paradigm is then tested by the researcher.

Legitimacy was characterized by Roberts and Cleric (2006) as the social affair of information that is suitable for the estimating instrument's planned application. A researcher's conclusions must be relevant, significant, accurate, and valuable in order to be considered valid. When creating or choosing a research instrument for analysis, validity is a crucial concept to take into account. The degree to which a survey or research scale assesses what it is intended to measure is referred to as its validity. A kind of subjective worth called content worth surveys whether the articulations in the estimating device precisely portray the event that is being evaluated. In order to confirm the validity of the material, a Like-scale questionnaire was used to gauge the participants' opinions about the survey's content. At the end of the day, steadfastness is how much a similar examination instrument is more than once used to yield similar outcomes under expected consistent conditions. A critical component in guaranteeing the review's discoveries are solid is the estimation gadget's trustworthiness. A gathering of educators with similar qualities as the examination members directed the poll for this review. A Cronbachs' alpha worth of 0.7 or higher is a mark of the interior consistency of the scale. Therefore, the researcher ensures the confidentiality of information for the researchers. The researcher also warrants that the research data and information is for research purposes only.

4. Analysis

Table 1: Descriptive statistic

Descriptive Statistics						
Question		N	Minimum	Maximum	Mean	Std. Deviation
The company has excellent welfare system for staffs	IA1	300	0	5	3,37	1,145
The company gives competitive working salary	IA2	300	1	5	3,24	1,084
The company give competitive benefits	IA3	300	0	5	3,25	1,125
The company provides flexible work hours	IA4	300	0	5	3,13	1,085
The company provides task diversity	IA5	300	1	5	3,12	1,222
The company provides job security	IA6	300	0	5	3,32	1,229
The company provides travel opportunities	IA7	300	0	5	3,15	1,209
The company offers advancement opportunities	IA8	300	1	5	3,2	1,142
an office environment where innovative and creativity are encouraged and valued	SA1	300	1	5	3,44	0,925
an office environment where capabilities are valued and encouraged	SA2	300	2	5	3,61	1,078
an office environment which is lively, performance-driven and result-oriented	SA3	300	1	5	3,38	1,029

an office environment that is open, friendly and sincere where honesty is emphasized	SA4	300	1	5	3,42	0,824
an office environment where the values of being trendy, classy or having charming style are treasured	SA5	300	1	5	3,39	1,164
The applicant's intention to apply to the company if they are offered	DA1	300	1	5	3,1	0,915
The applicant's intention to accept the job if offered,	DA2	300	1	5	3,22	0,97
The applicant's attraction level to work for the company	DA3	300	1	5	3,28	0,998
The applicant's knowledge about the company that makes them interested or disinterested	DA4	300	1	5	3,19	0,983
Valid N (listwise)		300				

Source: Compiled by author

4.1. Cronbach's alpha

The deliberate variable fulfills the necessities if the complete variable's amended thing absolute connection is under 0.3, as indicated by Bonett and Wright's (2014) Cronbach alpha test principles. The Segment Rectified - All Out-Connection coefficient shows the connection between the noticed variable and different factors on the scale, the nearer the connection between the noticed variable and different factors, the better.

Cronbach's Alpha coefficient value level:

From 0.8 to close to 1: very good scale.

From 0.7 to close to 0.8: good usability scale.

From 0.6 and above: qualifying scale.

As per Taber. While playing out Cronbach's Alpha examination for a component, in the event that the Cronbach's Alpha coefficient of the gathering is under 0.6 and no factor in the gathering has Cronbach's Alpha, in the event that the Thing Erased variable is more prominent than 0.6, it ought to be thought of. eliminate all variables.

Table 2: Cronbach's alpha of "Instrumental attributes"

Reliability Statistics	
Cronbach's Alpha	N of Items
0,736	8

Item-Total Statistics				
	Deleted Item Scale Mean	Scale Variance if Item Is Removed	Corrected Item-Total Correlation	Cronbach's Alpha if the item is removed
IA1	22,42	22,586	0,563	0,682
IA2	22,55	22,342	0,635	0,67
IA3	22,54	21,761	0,666	0,661
IA4	22,66	22,519	0,614	0,674

IA5	22,67	24,45	0,337	0,728
IA6	22,47	25,521	0,241	0,747
IA7	22,64	25,242	0,273	0,74
IA8	22,59	26,39	0,198	0,751

Source: Compiled by author

The Cronbach's alpha value is 0.736, which is greater than 0.6. However, the "Cronbach's Alpha if Item Deleted" value of the variables IA6, IA7 and IA8 is larger than the Cronbach's alpha value. Therefore, the author will use 5 variables: IA1, IA2, IA3, IA4, IA5 for performing exploratory factor analysis.

Table 2: Cronbach's alpha of "Symbolic attributes"

Statistics on Reliability				
Cronbach's Alpha			N of Items	
0,77			5	
Statistics for Item-Total				
	Deleted Item Scale Mean	Scale Variance if Item Is Removed	Corrected Item-Total Correlation	Cronbach's Alpha if the item is removed
SA1	13,8	8,754	0,676	0,685
SA2	13,63	7,96	0,689	0,672
SA3	13,86	8,179	0,692	0,673
SA4	13,82	9,537	0,607	0,714
SA5	13,85	10,607	0,177	0,861

Source: Compiled by author

The Cronbach's alpha value is 0.736, which is greater than 0.6. However, the "Cronbach's Alpha if Item Deleted" value of the variables SA5 is larger than the Cronbach's alpha value. Therefore, the author will use 5 variables: SA1, SA2, SA3, SA4 for performing exploratory factor analysis.

Table 3: Cronbach's alpha of "Decision to apply for job"

Statistics on Reliability	
Cronbach's Alpha	N of Items
0,959	4

Statistics for Item-Total				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
DA1	9,69	7,907	0,889	0,949
DA2	9,57	7,644	0,882	0,951
DA3	9,51	7,428	0,899	0,946

DA4	9,59	7,399	0,927	0,937
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Source: Compiled by author

The Cronbach's alpha value is 0.959, which is greater than 0.6 and Cronbach's Alpha if Item Deleted is less than Cronbach's alpha. Therefore, all these variables are reliable.

4.2. Exploratory factor analysis

Koyuncu and Kılıç assert that EFA produces results that may be broken down into fewer parts while still being able to explain a respectable portion of the overall variation. Bartlett's test statistic should be adequate to provide p-values less than or equal to 0.05, and the expected KMO should not be less than 0.5. Next, Spindle Calculus and Promax Rotation Technique are utilized.

In addition, each item of a selected component must meet a minimum load factor related requirement set at 0.5 (Knekta et al., 2019).

Table 4: First Rotated Component Matrix

Rotated Component Matrix			
	Component		
	1	2	3
IA1		0,751	
IA2		0,824	
IA3		0,802	
IA4		0,787	
IA5			
SA1			0,801
SA2			0,819
SA3			0,721
SA4			0,7
DA1	0,825		
DA2	0,829		
DA3	0,845		
DA4	0,878		
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
Rotation converged in 6 iterations.			

Source: Compiled by author

When performing Exploratory factor analysis with the above variables, the IA5 variable is not satisfied. Therefore, the author removed this variable and performed the Exploratory factor analysis again. The following results:

Table 5: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,896
Bartlett's Test of Sphericity	Approx. Chi-Square	2929,886
	df	66
	Sig.	0,00

Source: Compiled by author

The model has a high fit with the sample data shown by the relatively high KMO = 0.896 > 0.6 coefficient, which proves that this model has practical significance and can apply this analysis result in practice. Bartlett's test of sphericity (SigF), used to test the correlation between observed variables, reached 0.000, which is extremely low compared to the 5% significance level. As a result, there is a strong correlation between the model variables.

Table 6: Total variance explained

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6,569	54,738	54,738	6,569	54,738	54,738	3,327	27,723	27,723
2	1,745	14,542	69,28	1,745	14,542	69,28	3,051	25,421	53,145
3	1,04	8,665	77,945	1,04	8,665	77,945	2,976	24,801	77,945
4	0,606	5,049	82,995						
5	0,432	3,603	86,598						
6	0,406	3,381	89,979						
7	0,329	2,745	92,724						
8	0,293	2,441	95,166						
9	0,182	1,518	96,683						
10	0,16	1,335	98,018						
11	0,149	1,24	99,258						
12	0,089	0,742	100						
Extraction Method: Principal Component Analysis.									

Source: Compiled by author

When the total variance obtained from the model is greater than required (50%), as is the case when Eigenvalues > 1, the model is approved. Extracted variables account for 77.945% of observed variables.

Table 7: Rotated Component Matrix

Rotated Component Matrix	
--------------------------	--

	Component		
	1	2	3
IA1		0,776	
IA2		0,843	
IA3		0,804	
IA4		0,792	
SA1			0,825
SA2			0,858
SA3			0,751
SA4			0,708
DA1	0,83		
DA2	0,831		
DA3	0,825		
DA4	0,881		
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
Rotation converged in 5 iterations.			

Source: Compiled by author

The table “Rotated component matrix” shows that the variables are divided into 3 groups including: IA (IA1, IA2, IA3), SA (SA1, SA2, SA3), DA (DA1, DA2, DA3). Since it depends on the covariance approach, Pearson connection is viewed as the most effective way to decide the connection between factors of interest. It offers subtleties on the meaning of the association, or connection, as well as the relationship's course.

Table 8: Pearson correlation

Correlations				
		IA	SA	DA
IA	Pearson Correlation	1	,402**	,568**
	Sig. (2-tailed)		0	0
	N	300	300	300
SA	Pearson Correlation	,402**	1	,633**
	Sig. (2-tailed)	0		0
	N	300	300	300
DA	Pearson Correlation	,568**	,633**	1
	Sig. (2-tailed)	0	0	
	N	300	300	300

** Correlation is significant at the 0.01 level (2-tailed).

Source: Compiled by author

The coefficient estimates of the multiple regression in this situation might be unpredictable in reaction to little modifications in the model or data. At the point when the relapse model displays multicollinearity, a few markers might be in the mistaken succession, delivering the finishes of the quantitative examination unimportant. As per Ali (2010), the shortfall of multicollinearity in the model is shown when the autocorrelation coefficient between the factors is between - 0.7 and 0.7.

4.3. Regression results

Table 10: Model summary

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,720a	0,518	0,515	0,63567	1,89

Source: Compiled by author

R squared is a proportion of the integrity of spasm of a model, however changed R squared has a fairly unique importance since the changed R squared doesn't necessarily rise when we incorporate extra free factors into the model. Thus, the adjusted R-squared is all the more habitually used since it all the more precisely shows how well the relapse model fits the information (Karch, 2019). The independent elements might represent 51.8% of their effect on the reliant variable, as indicated by the changed R-squared worth of 0.518.

Table 9: ANOVA table

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	128,886	2	64,443	159,482	,000b
	Residual	120,011	297	0,404		
	Total	248,897	299			

Source: Compiled by author

F test: This index is used to check if the model has an independent variable that can affect the dependent variable.

Hypothesis:

Ho: $b_1 = b_2 = 0$

H1: $b_j \neq 0$

As indicated by the ANOVA table, the P Worth of the F-test is 0.000, which is less than the significance level of 0.05. Subsequently, H0 is dismissed and Ha is acknowledged. In this manner, the model exists somewhere around one variable that can influence the reliant factors.

Table 10: Coefficient

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		

1	(Constant)	0,174	0,174		0,999	0,32
	Instrumental attributes (IA)	0,35	0,041	0,374	8,494	0,00
	Symbolic attributes (SA)	0,541	0,049	0,483	10,967	0,00

Source: Compiled by author

T test: T-test is used to test whether each independent variable can affect the dependent variable. Hypothesis:

Ho: $b_j = 0$

H1: $b_j \neq 0$

The consequences of the relapse model show that every one of the five factors has Sig esteems under 5% factual importance. Subsequently, it is feasible to dismiss H0 and acknowledge Ha. In this way, each of the 2 factors essentially affect the reliant variable. The regression coefficient of “Instrumental attributes” is 0.35 and the regression coefficient of “Symbolic attributes” is 0.541, showing a positive impact of these two variables on Decision to apply for job.

Table 13: Hypothesis testing

Hypothesis	Impact
H1: Employer Brand positively affects applicants' decisions to apply for a job in Sun Group VN	Positive impact, through interviews with experts at Sun Group
H2: Instrumental attributes are positively related to perceptions of applicants on Employer Branding	Positive (Beta = 0.35, P-value = 0.00)
H3: Symbolic attributes are positively related to perceptions of applicants on Employer Branding.	Positive (Beta = 0.541, P-value = 0.00)

Source: Compiled by author

The formula of regression:

Decision to apply for a job = $0,174 + 0,35 * \text{Instrumental attributes} + 0,541 * \text{Symbolic attributes}$

The regression coefficient of “Instrumental attributes” is 0.35, showing that Instrumental attributes have a positive impact on Decision to apply for a job. When businesses improve "Instrumental attributes," Decision to apply for a job will increase 0.35 and vice versa.

The regression coefficient of “Symbolic attributes” is 0.541, showing that Instrumental attributes have a positive impact on Decision to apply for a job. When businesses improve "Symbolic attributes," Decision to apply for a job will increase 0.541 and vice versa.

5. Discussion of Finding

Recruitment is the phase in which firms publish job adverts to entice prospective candidates. Selection is the subsequent stage following recruitment, encompassing the activities of conducting interviews, making choices, and implementing a probationary period. This study demonstrates the significance of both instrumental traits and symbolic attributes in influencing the decision to apply for employment at Sun Group. The attributes of a firm that can facilitate the recruiting of talented individuals include: The Company provides exceptional employee benefits, offers competitive compensation, flexible working hours, a diverse range of duties, job security, and travel opportunities, all of which contribute to creating prospects for career progression.

Acquiring and maintaining highly skilled employees is crucial for attaining a competitive edge in any firm, as human resources play a vital role in establishing a company's competitive advantage. Given the strategic importance of corporate image in improving competitive advantage, certain firms are consistently seeking novel methods to boost their image. Nevertheless, the growing need for highly skilled individuals in the knowledge

economy has led to a more unrestricted movement of personnel. While scholars have debated the potential benefits of implementing a deliberate and widely shared set of best practices in human resource management, there is less empirical research examining the impact of such practices on employer branding and candidate attraction.

The findings suggest that an individual's attitude and desire towards a company are important factors in predicting their intention to apply for a job. Furthermore, it was shown that the ability to attract job seekers was greatly influenced by the employer's and corporate image. Nevertheless, the results suggest that the market image has minimal or negligible impact on attracting job applications. The objective of this study is to enhance applicant attraction with the goal of enhancing staff recruiting from a pragmatic perspective.

6. Conclusion and Recommendation

The paper aims to examine the relationship between an organization's corporate image and job seekers' propensity to apply by evaluating the level of human-organizational fit. The researcher conducts a thorough examination of the relationship between business image and people-organization fit. The Sun Group workforce is part of the intended audience. The study included data about authentic employment prospects gathered from 300 individuals. The results indicate a direct relationship between the reputation of a firm and the intention to apply for a job, as well as the alignment between an individual and the organization. Additionally, the study shows that recruitment messages that include detailed information reinforce this finding. The study's findings clearly demonstrate the significant importance of firm reputation in understanding the attraction stage of the recruitment process. Consequently, those looking for employment are more likely to apply for jobs at companies that have a positive reputation. Companies should recognize that their corporate image has a positive impact on employment selection decisions, which in turn helps recruit more highly skilled applicants. Therefore, companies should make deliberate attempts to improve this aspect. In order to attract clients, Sun Group should consider how job advertisements and other recruitment techniques contribute to the company's image, and how this image subsequently impacts the company's reputation. Skilled job seekers looking for jobs. Many individuals frequently desire to get employed by prominent and well-known firms. For inexperienced applicants, companies such as Sun Group offer valuable opportunities to acquire practical knowledge and prepare for their careers. For candidates with extensive job experience, this is a chance to showcase their value in the labor market. The worth of an employee after three years of service with the company will vary from the cost of a new employee in the role of an apprentice. Candidates continue to strive to work for renowned corporations such as Sun Group due to the reputation associated with these organizations.

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Analyzing Potential Implementation of Sustainability Linked Loan in PT United Tractors Tbk

Muhammad Hafizh Alfath¹, Harimukti Wandebori², Widhyawan Prawiraatmadja³

^{1,2,3} School of Business and Management, Institut Teknologi Bandung, Bandung, Indonesia

Correspondence: Muhammad Hafizh Alfath, School of Management, School of Business and Management, Institut Teknologi Bandung, Bandung, Indonesia. E-mail: muhammad_alfath@sbm-itb.ac.id

Abstract

Since the Paris Agreement in 2015, climate change has become an important global issue, prompting companies to adopt sustainable practices. PT United Tractors Tbk (UT), which relies heavily on coal, faces challenges due to the declining coal market and increasing emphasis on Environmental, Social and Governance (ESG) principles. This research explores UT's strategic transition to diversify into the minerals and renewable energy sectors and assesses the potential of Sustainability Linked Loans (SLL) to support this transition. The research aims to evaluate UT's readiness to implement SLL by examining its business strategy, ESG initiatives, and financial performance. A qualitative approach was used, involving semi-structured interviews with UT management and analysis of annual reports. Findings show that UT is committed to achieving a 50-50 revenue balance between coal and non-coal businesses by 2030. SLL offers a viable funding solution, providing financial flexibility and incentivizing ESG improvements through interest rate discounts. The study concludes that UT's strong commitment to sustainability and proactive management puts it in a good position to obtain SLL, enhancing its ability to balance its portfolio and achieve long-term sustainability. Recommendations include improving ESG measurement systems, securing SLL agreements, and continuously monitoring ESG achievements to maximize benefits.

Keywords: Sustainability Linked Loans, ESG, Business Strategy, Sustainable Business, Coal Transition, UT

1. Introduction

Since the Paris Agreement was signed on 12 December 2015, the issue of climate change has become a prominent global topic. The agreement obliges countries to keep the global average temperature rise below 2°C above pre-industrial levels and pursue efforts to limit the temperature rise to 1.5°C. It also mandates countries to enhance their ability to adapt to adverse climate impacts, promote climate resilience, and encourage the development of low greenhouse gas emissions without compromising food production. The 2030 Agenda for Sustainable Development, adopted by the United Nations on 25 September 2015, underscores the importance of green finance. Initially focussing on projects directly related to environmental improvement, green finance has evolved to include mechanisms such as Sustainability Linked Loans (SLL). SLLs aim to encourage borrowers to engage in economic sustainability activities that are aligned with Environmental, Social, and Governance (ESG) principles (APLMA, LMA, and LSTA, 2023).

Indonesia, as the largest economy in Southeast Asia, faces significant climate risks due to its exposure to flooding and high heat (WBG and ADB, 2021). Recognising the need to manage these risks, Indonesia has developed an Enhanced Nationally Determined Contribution (Enhanced NDC) to reduce emissions and achieve Zero Emissions (NZE) by 2060 or sooner. PT United Tractors Tbk (UT), a major player in Indonesia's heavy equipment, mining and energy sectors, faces challenges due to its reliance on coal, a non-renewable resource with high greenhouse gas emissions. The global shift towards reducing coal consumption, influenced by the Paris Agreement and ESG trends, threatens UT's sustainability. Financial institutions are increasingly reluctant to fund coal-related projects, further limiting UT's funding options (Chan et al., 2022). Therefore, UT must develop a business strategy to shift from coal dependency to sustainable practices.

Several researchers have focused on the impact of ESG criteria on financial performance and the role of green financing in promoting sustainability. However, there is still limited research on the application of ESG in business transition from coal dependency. This research intends to fill this gap by exploring the strategic use of SLL in supporting UT's business transformation. The objectives of this study are to understand UT's business strategy for sustainability, assess the potential of SLL in implementing the strategy, and evaluate UT's readiness to adopt SLL.

2. Literature Review

2.1. Business Strategy

Business strategy plays an important role in how companies operate and compete to generate revenue and profit. According to Magerakis and Habib (2021), business strategy has a significant impact on financial reporting quality, tax avoidance, investment efficiency, audit quality, stock price stability, voluntary information disclosure, and corporate social responsibility (CSR) performance. A well-conceived strategy enables a company to outperform its competitors and achieve superior profitability (Thompson et al., 2022). Effective business strategies aim for short-term success and long-term sustainability and growth. Companies should follow a structured strategic management process, which involves analysis, strategy development, and implementation to achieve competitive advantage and above-average profits (Hitt et al., 2019). This process, represented by the A-S-P Model (Figure 1), requires continuous monitoring and adaptation to changing market conditions and internal dynamics.

In addition to a robust strategic management process, firm-level strategies such as horizontal integration, vertical integration, and diversification help companies maintain and optimise profitability by navigating current and future business trends (Hill et al., 2019). Sustainable business practices, which integrate environmental, social, and governance (ESG) aspects, are also critical for long-term success (Thompson et al., 2022; Zahan, 2021). Companies that prioritise CSR and sustainability often experience increased customer loyalty and reduced reputational risk (Simon et al., 2024; Wang et al., 2024). An integrated sustainability strategy, supported by top management commitment, positively influences firm performance and investor confidence (Rahman et al., 2023; Thun et al., 2024). By implementing these strategies, companies can ensure their operations remain competitive and profitable while promoting sustainable development.

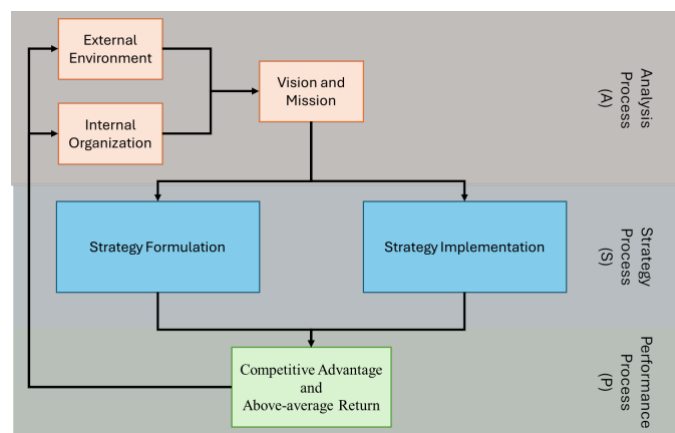


Figure 1: A-S-P Model

2.2 Sustainability Linked Loan (SLL)

Sustainability Linked Loans (SLLs) were first introduced in 2019 as financial tools, including loans and contingent facilities, whose economic features can change based on the borrower's achievement of specific and measurable sustainability goals (APLMA, LMA, and LSTA, 2023). These transition tools are designed to assist borrowers in improving their sustainability performance during the transition process. Unlike taxonomies that aim to identify specific sustainable economic activities, SLLs directly link a company's ESG attributes to the cost of debt, providing interest rate discounts if the company fulfills its non-financial indicators (Pop and Atanasov, 2021). SLL incentivises borrowers to improve their sustainability performance through loan interest rate adjustments based on audit reports and findings (Carrizosa and Gosh, 2023). Borrowers with a strong environmental profile may benefit from lower interest rates, while failure to achieve sustainability targets may result in higher interest rates (Du, 2022).

SLLs are available to any borrower subject to applicable laws and credit assessment, provided they can demonstrate the necessary strategic components, including certain KPIs and SPTs (APLMA, LMA, and LSTA, 2023). Unlike green loans, which are limited to green projects, SLL funds can be used for general purposes, with the key difference being the incorporation of ESG measurements (Kim et al., 2021). The core elements of SLL include KPI selection, SPT calibration, unique loan characteristics, reporting, and verification. KPIs should be relevant to the borrower's industry and ESG challenges, while SPTs should show significant improvement beyond business-as-usual activities and compared to external references. Reporting of SPT achievements is critical for determining interest rate discounts, and verification by independent and external parties ensures the credibility of reported achievements (APLMA, LMA, and LSTA, 2023). SLL offers flexible finance solutions that align borrower incentives with sustainability goals, providing potential cost efficiencies through interest rate adjustments. By allowing customization of KPIs and SPTs, SLLs enable customized sustainability improvements, subject to independent verification to ensure relevance and accuracy in ESG measurement (Kim et al., 2021). This unique structure supports a company's financial and sustainability strategies, driving continuous progress towards environmental, social, and governance goals.

2.3. External Analysis

The external analysis aims to identify strategic opportunities and threats in the firm's environment that impact the firm's objectives (Hill et al., 2019). This analysis examines three interrelated environments: the industry, the national environment, and the broader socioeconomic or macro environment. The industry analysis covers the competitive structure, company position, and key competitors, focusing on the nature, stage, dynamics, and history of the industry. The national environment assessment considers the domestic and global context, taking into account players from developed and emerging economies. Socioeconomic analysis, or macro-environmental analysis, involves evaluating political, economic, social, technological, environmental, and legal conditions using PESTEL analysis to understand their impact on the company (Thompson et al., 2022). For competitor analysis, Michael E. Porter's Five Forces framework is used to evaluate competition from rivals, potential new entrants, substitute products, supplier power, and customer power, and identify opportunities and threats (Hitt et al., 2019; Goyal, 2020). Market analysis involves market segmentation, targeting, and positioning to effectively identify customer needs and competitive positioning (Hitt et al., 2019; Camilleri, 2018). By integrating these analyses, companies can devise robust business strategies that align with the external environment and competitive landscape, ensuring they capitalize on opportunities and mitigate threats.

2.4. Internal Analysis

Internal analysis allows a company to determine how to utilize its resources, capabilities and core competencies to develop an accurate business strategy (Hitt et al., 2019). This process focuses on evaluating the internal aspects of the company to identify strengths and weaknesses, as emphasized by Hill et al. (2019). Conducting internal and external analyses is critical to building a sustainable competitive advantage (Hill et al., 2019). Resource analysis, an important part of internal analysis, uses the Resource Based View (RBV) theory to understand a firm's resources and capabilities that can create competitive advantage (Lubis, 2022; Wernerfelt, 1984; Barney, 1991). Resources

are classified into tangible resources, such as financial, organizational, physical, and technological resources, and intangible resources, such as human resources, innovation resources, and reputation resources (Hitt et al., 2019; Hill et al., 2019; Thompson et al., 2022). Once resources are understood, firms must perform value chain activities to produce and offer goods and services to the market. These activities, which are essential for creating customer value, include key activities such as supply chain management, operations, distribution, sales and marketing, and after-sales service, and supporting activities such as research and development, human resource management, and general administration (Thompson et al., 2022; Hitt et al., 2019). By analyzing these components, companies can effectively formulate strategies to maintain competitiveness and achieve long-term success.

2.5. SWOT Analysis

SWOT analysis is an effective tool for strategising an organisation by identifying the company's internal strengths and weaknesses, as well as external opportunities and threats (Kumar and Praveena, 2023). It is commonly used in business planning and decision-making processes to evaluate various circumstances. Benzaghta et al. (2021) state that SWOT analysis is more useful when combined with other analytical tools. Therefore, this research integrates SWOT with internal and external analyses to properly assess the topic and achieve the research objectives. The strengths and weaknesses identified in the SWOT analysis come from the internal analysis, while opportunities and threats arise from the external analysis. Hill et al. (2019) advocate the use of SWOT to capitalise on opportunities, counter threats, build on strengths, and overcome weaknesses. This analysis is crucial to evaluate the readiness of PT United Tractors Tbk (UT) in implementing Sustainability Linked Loans (SLL), as it examines the company's resources, capabilities, and challenges. After conducting the SWOT analysis, the results should be further analysed using the Threats, Opportunities, Weaknesses, and Strengths (TOWS) framework to develop an effective business strategy. TOWS helps manage risks by capitalising on opportunities, addressing weaknesses with opportunities, and mitigating threats (Dandage et al., 2019; Aransyah, 2023). This combined approach ensures the formulation of a well-implemented business strategy.

3. Method

This research was designed with a qualitative objective, focusing on understanding UT's business strategy amidst the downturn in the coal industry and assessing its readiness to adopt Sustainability Linked Loans (SLL). Merriam and Tisdell (2016) define a qualitative case study as an in-depth analysis of a bounded system, making it ideal for exploring UT's strategic approach and management's perspective on SLL as a funding source. This research used semi-structured interviews to gather detailed insights into UT management's values, experiences and knowledge of coal business trends, sustainability, financing, ESG, compliance and SLL (Ruslin et al., 2022).

To ensure the research obtained relevant and in-depth information, expert sampling was conducted by targeting UT executives responsible for finance, sustainability and legal aspects. This included the President Director, Finance Director, Sustainability Director, and the Heads of Finance, Sustainability and Legal Divisions, to ensure that the participants had in-depth knowledge related to the research objectives (Kumar, 2011). The data collection process involved developing a list of key questions for semi-structured interviews, including questions about experiences, opinions, values and knowledge, which provided flexibility to explore participants' responses while maintaining a structured discussion (Merriam and Tisdell, 2016).

Following data collection, the analysis process involved organising, coding and interpreting the interview data to identify themes and relationships, in accordance with Creswell's (2013) methodology. This process included verifying the data through triangulation with UT's Annual Report and Sustainability Report for 2023, and other data as available to public, to ensure reliability and consistency. In addition, the interpreted data was analysed using theoretical underpinnings to validate the scientific merit of the findings. This comprehensive methodology aims to provide a reliable, ethical and academically sound analysis of UT's business strategy and its readiness to implement SLL.

4. Results

The interviews with six key respondents from UT, including the President Director, Finance Director, Sustainability Director, and Head of Finance, Sustainability and Legal, revealed three main themes: business strategy, sustainability, and Sustainability Linked Loans (SLL). The interviews were transcribed, coded and analyzed to identify patterns and key themes, providing a basis for creating relevant business solutions. The transcriptions were carefully analyzed to determine key themes and recurring trends, with each section summarized using relevant codes that represent respondents' thoughts, feelings and concepts.

For business strategy, respondents indicated a transition from coal to non-coal sectors, with UT aiming to diversify into minerals and renewable energy. The President Director stated, *"We have a policy of not adding coal assets,"* while the Finance Director mentioned, *"We are installing solar panels across Astra's business units."* This shift is in line with UT's goal to have a balanced portfolio of coal and non-coal businesses by 2030. The Head of Finance highlighted, *"UT has publicised that by 2030, UT's target is 50-50 between coal and non-coal businesses."* The Director of Sustainability also emphasised, *"We are entering the mineral business and renewable energy business,"* reinforcing the strategic direction towards diversification.

In terms of sustainability, compliance with ESG aspects and commitment to carbon reduction were highlighted. The President Director stated, *"We have 10 (ten) ESG initiatives,"* and the Finance Director added, *"Our KPIs on ESG impact UT's management assessment."* Efforts to reduce CO₂ emissions by 20% by 2030 were also discussed, with the Finance Director stating, *"Until 2030, we are trying to reduce CO₂ emissions by about 20% using the 2019 baseline."* The Head of Sustainability mentioned, *"The aspiration related to the environment is related to Greenhouse Gas Emission Reduction,"* indicating UT's proactive steps in sustainability initiatives.

Regarding SLL, respondents expressed interest in this funding option due to the potential for competitive interest rates and its alignment with UT's ESG initiatives. The Director of Finance stated, *"With the ESG initiatives that we have undertaken, entering into a sustainability-related loan would be very helpful."* The Head of Finance mentioned, *"We see this SLL as an opportunity for us to implement it because the benefits we can get include a reduction in the interest rate."* All respondents expressed confidence in UT's readiness to implement SLL, citing their ongoing ESG initiatives and strategic business transition. The President Director affirmed, *"I think, initiative-wise, we are ready."* The Head of Legal added, *"We have clear direction and high commitment from management to comply with regulations including in terms of ESG aspects, I can assure myself that we are ready for SLL."*

These themes, supported by theoretical underpinnings, provide a strong basis for proposing business solutions for UT in the face of the anticipated coal market downturn and exploring SLL as a funding option. The scientifically grounded approach ensures that the proposed solutions are feasible and actionable for UT's business processes. The integration of strategic business transition, ESG compliance, and SLL implementation can help UT achieve long-term sustainability and competitive advantage in an evolving market landscape.

4. Discussion

4.1. Business Strategy of UT

UT has set its business strategy to address the declining coal business trend by diversifying into non-coal sectors, including mineral mining (gold and nickel) and renewable energy. According to UT management statements, such as the Finance Director and Sustainability Director, UT is committed to this diversification, focusing on the acquisition of non-coal mining assets and the development of renewable energy projects. The Finance Director and Sustainability Director emphasised UT's goal to achieve a 50-50 revenue balance between coal and non-coal businesses by 2030, in line with the President Director's statement in UT's 2023 Annual Report. This strategy began in 2018 with the acquisition of a gold mine and continued with investments in renewable energy and nickel mining. UT's vision to be a world-class solutions-based company and its mission to create sustainable value for stakeholders underpin this strategy, which aims to balance the portfolio and reduce reliance on coal. UT's 2030 Sustainability Aspiration integrates ESG factors into its business strategy, with a focus on reducing greenhouse

gas emissions, resource management, and community development. The company's alignment with the TCFD framework and the achievement of a renewable energy mix of 32.47% by 2023 demonstrate its commitment to sustainability. Using the A-S-P Model by Hitt et al. (2019), UT's strategy reflects an assessment of the declining coal trend and increasing demand for minerals and renewable energy, formulating a corporate-level strategy that focuses on diversification to ensure long-term sustainability and profitability.

4.2. Sustainability Linked Loan

UT requires considerable investment funds to diversify into mineral mining and renewable energy due to the decline of the coal business. Although the coal business provides some funds, it is not sufficient to acquire new companies and cover operating costs. UT faces funding constraints due to its coal-centric image and 3L restrictions under Indonesian Financial Services Authority (OJK) regulations, which limit funding from Indonesian financial institutions for consolidated groups such as Astra. To overcome these challenges, UT is considering Sustainability Linked Loans (SLL) as a viable option. SLLs offer flexibility for capital expenditure and operating costs and are in line with ESG objectives. The President Director said, *"We have to see if we can get SLL. For me, if we can lower the investment cost, why not."* The Finance Director emphasised the difficulty of getting financing and the potential benefits of SLL, *"Even to get financing itself, it is no longer easy for us. So, interest rate is the second priority. Firstly, getting funding. Second, getting a better interest rate."*

Several banks have approached UT with SLL proposals, showing their interest in supporting UT's sustainable transition. SLL offers benefits such as lower interest rates, additional funding for diversification, and improved ESG performance through rigorous external verification. The Chief Financial Officer highlighted SLL as a way to introduce UT's ESG commitment to the financial markets, *"SLL as 1 (one) sustainable loan is being reviewed by us in 2024. We see SLL can be one of our efforts to introduce UT that UT has a loan with ESG as its KPI."*

UT's readiness to implement SLL is supported by interviews with management. The President Director stated, *"I can say that in terms of initiatives, we are ready (to implement SLL)."* The Director of Finance noted UT's pioneering role in ESG implementation, and the Director of Sustainability emphasised UT's strategic programme to diversify by 2030. The Chief Financial Officer confirmed UT's clear objective to transition to a diversified business model, and the Chief Sustainability Officer highlighted UT's strong position to deliver ambitious ESG programmes. In summary, UT's consideration of SLL is strategic to secure the necessary funding for diversification and improved sustainability performance, with management confident in UT's readiness to adopt SLL based on established ESG practices and clear strategic direction.

4.3. External Analysis

External analysis is essential to assess opportunities and threats in the company's external environment (Ashutosh et al., 2020). This analysis helps determine how external factors may affect UT's readiness to implement Sustainability Linked Loans (SLL). The external analysis for UT's adoption of SLL involves PESTEL analysis, competitor analysis, and market analysis.

Using PESTEL analysis, UT can understand broader macro environmental factors. Politically, global trends and Indonesia's commitment to the Paris Agreement support SLL as a mechanism to improve ESG practices. Economically, the limited availability of funds for fossil energy highlights the need for sustainable financial instruments such as SLLs, which also offer interest rate incentives (Chan et al., 2022). Socially, UT's commitment to corporate social responsibility is aligned with SLL principles. Technologically, sophisticated monitoring and evaluation tools are essential for tracking ESG targets, thus enhancing UT's sustainability efforts. Environmentally, SLL can support UT's goal to reduce greenhouse gas emissions, contributing to Indonesia's NZE targets. Legally, regulations such as Indonesian Presidential Regulation No. 112 Year 2022 and the 3L Limitation challenge UT funding sources, but also create opportunities for SLL to facilitate compliance and sustainability (Hill et al., 2019; Thompson et al., 2022).

Competitor analysis using Michael E. Porter's Five Forces framework revealed that the threat of new entrants in the heavy equipment industry is low due to high capital requirements. UT's long-term relationships with suppliers reduce their bargaining power, while high bargaining power from customers is a challenge due to dependence on coal prices. The threat of substitute products is low, given the specialised nature of heavy equipment. However, competition among competitors remains high due to the industry's dependence on coal (Hitt et al., 2019). This analysis shows that while UT faces significant competition, it also highlights the stability and long-standing relationships UT has with its suppliers, which is a strong strategic advantage.

Market analysis through segmentation, targeting and positioning shows that UT caters to the B2B market in Indonesia, specifically focusing on the mining sector. UT's extensive branch network and service solutions position it as a leading heavy equipment provider. In addition, UT is transitioning to be recognised as a sustainable company, as reflected in its Sustainability Aspiration 2030 and efforts to introduce ESG-focused financial instruments such as SLL (Camilleri, 2018). This dual focus on market leadership and sustainability is critical to UT's long-term strategy, especially given the global shift towards greener practices. In summary, external analyses show that SLL aligns with UT's strategic objectives, helps balance its portfolio between coal and non-coal businesses, enhances ESG practices, and secures necessary funding amidst challenging financial regulations. This comprehensive approach ensures that UT can maintain its competitive advantage and profitability while advancing its sustainability goals.

4.4. Internal Analysis

The internal analysis evaluated UT's resources, capabilities, and competencies to identify strengths and weaknesses in acquiring SLL facilities from banks (Hill et al., 2019; Thompson et al., 2022). This analysis, which focuses on resources and value chain activities, complements the external analysis to formulate a comprehensive SWOT analysis, which examines UT's readiness to obtain SLL.

The resource analysis begins with financial resources, where UT demonstrates a strong financial position. The Director of Finance stated, "If we look, historically, UT has a strong balance sheet because of the existing business." This is supported by the Head of Sustainability Division's statement, "*UT still has enough resources to try to run the ESG programme, to evaluate and improve the programme.*" Organisational resources include established KPIs related to ESG that are integrated into UT's management evaluation, supported by the Sustainability Directorate and Sustainability Division. Facility resources include UT's waste treatment and recycling facilities, which demonstrate a strong commitment to ESG. Technologically, UT has adopted advanced technologies such as IoT to monitor ESG performance, which enhances its readiness for SLL.

Furthermore, analysis of value chain activities highlighted key activities such as supply chain management, operations, distribution, sales, and after-sales service. UT's strong relationships with green machine manufacturers such as Komatsu, Bomag, and Scania support its supply chain. Operations are optimised through a widespread network of branches and representative offices, with a focus on efficiency and productivity. Distribution is facilitated by UT's extensive logistics infrastructure, ensuring timely delivery of products. Sales and marketing strategies include direct sales and digital platforms, emphasising customer relationship management. After-sales services, including 24/7 support through UT Call and UT Command Centre, ensure customer satisfaction.

Support activities include product R&D, technology, and system development, where UT invests in environmentally friendly equipment and renewable energy solutions. Human resource management focuses on continuous development and training aligned with sustainability goals. General administration adheres to strict regulatory compliance, exploring various funding sources to support business diversification into minerals and renewable energy. This diversification is critical to UT's sustainability amid current business trends. An internal analysis of financial, organisational, facility and technology resources, as well as a detailed value chain activity assessment, provided a clear understanding of UT's strengths and readiness to implement SLL. This comprehensive approach ensures UT can effectively leverage its internal capabilities to support sustainable growth and secure SLL funding.

4.5. SWOT Analysis

SWOT analysis is an important tool used to evaluate the effectiveness of a company's business strategy, and in this study, SWOT analysis is combined with external and internal analyses to assess UT's readiness to obtain a Sustainability Linked Loan (SLL). Internally, UT's strengths lie in its strategic plan to diversify its portfolio into minerals and renewable energy by 2030, as well as a strong ESG framework integrated into day-to-day operations. This commitment to sustainability, coupled with proactive leadership and strong financial performance, enhances UT's credibility and attractiveness to banks offering SLL. However, weaknesses include UT's perceived dependence on coal, which poses challenges in achieving the KPIs and SPTs required under the SLL, and the complexity and resource intensity involved in implementing accurate monitoring and evaluation systems for ESG compliance.

Externally, opportunities arise from the increasing global and domestic emphasis on sustainability and green finance facilities, which allow UT to improve ESG measurement and secure additional funding sources despite regulatory limitations. In addition, SLL can help UT assert its market position as a leading heavy equipment company committed to sustainability. Threats include potential lenders' perception of UT's dependence on coal, evolving ESG criteria, and competition from competitors who are also transitioning to sustainable practices. To meet these challenges, UT can leverage its strengths to capitalise on opportunities, address weaknesses by investing in ESG compliance infrastructure, and mitigate threats by improving ESG reporting and maintaining its market leadership through continuous improvement of sustainability initiatives.

Based on this analysis, it is clear that UT is well positioned to secure a Sustainability Linked Loan (SLL) from the bank. SLL offers significant benefits, addressing UT's need for funding to acquire mineral and renewable energy companies, thus ensuring business sustainability amidst the downturn in the coal industry. With limited financial facilities for the coal business and regulatory restrictions such as OJK's 3L Limitation, SLL provides a flexible and suitable funding solution. This multi-purpose finance facility can be utilised for acquisitions and operating expenses, thus enhancing UT's ability to balance its portfolio between coal and non-coal businesses. In addition, the ESG-related KPIs and SPTs in the SLL can enhance and improve UT's existing ESG measurements as outlined in Sustainability Aspiration 2030 of UT. To effectively implement the SLL, UT must engage in activities that interest banks and ensure that they can utilise the full benefits of the SLL.

5. Conclusion

In conclusion, UT's strategic approach to diversify and balance its portfolio between coal and non-coal sectors by 2030 is critical for sustainability amidst the declining coal business trend. This strategy requires additional funding to acquire companies in the minerals (nickel and gold) and renewable energy sectors. Given the limited funding from traditional sources due to green financing trends and regulatory constraints such as the 3L Limitation, SLL became a viable alternative. SLL offers general purpose funding while enhancing ESG initiatives through specific KPIs and SPTs. If UT successfully meets these targets, it can benefit from better ESG measurement and potential interest rate discounts, which in turn can improve profitability. The company's strong commitment to sustainability, evidenced by its ESG-related KPIs and 2030 Sustainability Aspirations, as well as management's dedication to these goals, underscores UT's readiness to adopt SLL as a source of funding for its diversification strategy.

It is recommended that UT apply for SLL due to its benefits in improving ESG aspects, providing additional funding, and improving profitability through interest rate incentives. To implement this recommendation, UT should first improve ESG measurement through initiatives that improve evaluation systems, enhance ESG infrastructure, educate employees on ESG competencies, and communicate a strong commitment to ESG. Secondly, UT must secure SLL by opening communication with lenders, negotiating SLL agreements, and finalising these agreements. Finally, UT must continue to monitor and evaluate its achievements against the agreed KPIs and SPT to benefit from the interest rate reduction and continuous ESG improvement.

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Impulse Buying of Fashion Products as the Impact of Hedonic Shopping Motivation and Price Discounts During Harbolnas: Case Study on Generation Z Consumers of Several E-Commerce in Bandung City

Rini Handayani¹, Fansuri Munawar²

^{1,2} Faculty of Economic and Business, Widyatama University, Bandung, Indonesia

Correspondence: Rini Handayani, Faculty of Economic and Business, Widyatama University, Bandung, Indonesia. E-mail: rini.handayani@widyatama.ac.id

Abstract

With the transition of the pandemic status in Indonesia to an endemic stage, consumer shopping behaviors have been affected, although online shopping remains predominant. Studies indicate that online shopping can help improve mood during challenging times like these. Harbolnas is a special moment for consumers who enjoy shopping, as every e-commerce platform offers discounts and a variety of attractive promotions. The abundance of promotions subsequently leads to impulsive buying behavior. The purpose of this study is to understand consumer perceptions of hedonic shopping motivations, price discounts, and impulsive purchases among Generation Z consumers during Harbolnas in Bandung, as well as their impacts. This research is descriptive-verified in nature. The unit of analysis comprises several e-commerce platforms (Tokopedia, Shopee, Bukalapak, Lazada, and Blibli). The observation unit is Generation Z consumers in Bandung who enjoy online shopping. The minimum sample size is 100 individuals. Data collection techniques include questionnaires and interviews, while the sampling technique employed is purposive sampling. The analytical tool used is multiple linear regression. Hypothesis testing indicates that hedonic shopping motivations and price discounts significantly influence impulsive buying behavior among Generation Z consumers in Bandung.

Keywords: Hedonic Shopping Motivation, Price Discount, Impulse Purchase, E-Commerce, Harbolnas

1. Introduction

According to the We Are Social report, the number of internet users in Indonesia reached 213 million by January 2023. This figure represents 77% of Indonesia's total population of 276.4 million at the beginning of 2023. The number of internet users in the country increased by 5.44% year-on-year (Liu et al., 2018). Online shopping through e-commerce has become a societal habit, primarily driven by the COVID-19 pandemic. This trend is evident in the e-economy SEA 2023 report, which states that 80% of internet users in Indonesia have shopped online at least once (katadata.co.id, September 2023). Some of the reasons consumers choose to shop online include the ability to access catalogs and goods for sale 24 hours a day without time restrictions, the ease of

comparing prices from different shops, saving time and money, and the extensive range of available products (both domestic and international). The momentum of the pandemic has necessitated the transfer of almost all basic needs and various other activities to digital services, including shopping via e-commerce (Galhotra & Dewan, 2020).

The survey results indicate that the majority (91%) of the public have shopped during promotional campaigns on online shopping platforms, such as twin dates, Harbolnas, and Pay Day (Putri & Rohman, 2018). Additionally, 67% of respondents expressed high enthusiasm for promotional campaigns due to benefits such as additional free shipping (75%), flash sales (69%), and double discounts (60%). According to the Populix survey, 54% of Indonesians prefer to shop on e-commerce platforms, with the majority being Generation Z. Generation Z, defined as those born between 1995 and 2010, generally exhibit a fear of missing out (FOMO) when shopping, largely due to their exposure to social media interactions (Karimkhan & Chapa, 2021). Consequently, Gen Z tends to purchase goods or products impulsively, following current lifestyle trends. The numerous promotions offered often lead to impulse buying, characterized by an impulsive or sudden decision to purchase goods or services without prior planning (Yadav & Sharma, 2022). The Trade Desk found that Indonesian consumers can be categorized into two types when it comes to online shopping: planned shoppers and impulsive shoppers. Approximately 64% are planned shoppers, while 14% identify as impulsive. Interestingly, during online shopping festivals, about 42% of consumers who consider themselves planned shoppers become impulsive, leading to an increase in the number of products they purchase (Akram et al., 2018). This phenomenon is evidenced by the doubling of impulse purchases during online shopping festivals.

The frequently purchased product categories are food and drink (69%), household goods (68%), fashion (59%), fresh food (41%), personal care (48%), and cosmetics (39%). Fashion, in particular, remains a significant product category amidst the development of an increasingly modern industry. Fashion choices can reflect and express a person's identity and social status, making individuals easily identifiable by their attire. Involvement in fashion is closely linked to personal characteristics, especially among women and the younger generation. A high level of involvement in fashion facilitates impulse purchases of fashion products, as consumers desire to appear fashionable and attractive (Kautish & Sharma, 2018). A survey of 2,000 people in the US, conducted by both Slickdeals and OnePoll, found that the COVID-19 pandemic has significantly impacted spending habits. Interestingly, the research also indicates that online shopping can help improve people's spirits during challenging times like the current pandemic (Sheth, 2020). According to the survey results, 72% of respondents admitted to making impulse purchases online during the pandemic. They also reported experiencing a positive impact on their mood due to online shopping during the lockdown period (Gupta & Mukherjee, 2022).

Hedonic shopping motives are prevalent among many teenagers today due to environmental influences. This is especially true for Generation Z, those born between 1995 and 2010, who were exposed to technology earlier than previous generations. The primary reason Generation Z shops online is to save time and money. This generation values information, aesthetics, ease of use, security, and privacy when using a website (Elida et al., 2023; Priporas et al., 2017). With a marketing strategy that employs attractive promotions and significant discounts, consumers, especially Generation Z, purchase goods they do not need because they feel happy and satisfied when acquiring products at low prices (Pika, 2023). One factor influencing impulse purchases is price discounts, which are reductions from the list price set by companies during a specific period to attract more consumers to buy a product (Ajizah & Nugroho, 2023). Another important factor influencing impulse buying is hedonic shopping motivation. Hedonic shopping behavior involves activities aimed at seeking pleasure and satisfaction (Widagdo & Roz, 2021). This view is supported by the research of Octaviana & Komariah (2022), who found that hedonic shopping motivation and price discounts influence impulse purchases. However, according to the research by Ittaqullah et al. (2020) and Purnamasari et al. (2021), hedonic shopping motivation and price discounts have no effect on impulse purchases.

Impulsive buying is difficult to avoid during massive, short-term discounts such as Harbolnas. Research has shown that impulse buying is more likely to involve items that are not truly needed or are needed less (Shi & Joo, 2023). Customers are not only tempted by price cuts but are also unable to think rationally due to the deliberately short duration for decision-making (Putri & Rohman, 2018). The number of promotions and

discounts offered by each e-commerce platform leads to impulse buying behavior, characterized by an impulsive or sudden decision to purchase goods or services without prior planning (Panjaitan & Marpaung, 2023). Impulse purchases are spontaneous decisions made by consumers when they see promotions on the web and can be triggered by various factors, such as attractive products, discounts, or new arrivals. Consumers are particularly motivated to purchase products when they are offered at low prices and discounts (Ahmetoglu et al., 2014). According to Bhakat & Muruganantham (2013) research, external and internal factors can stimulate impulsive buying. Among the external factors, price discounts are one of the primary stimuli. Internally, there is the hedonic motivational factor, which is related to feelings that are more dominant than rational thinking when shopping. The research results of Xu & Huang (2014), Noor et al. (2020), and Widyastuti & Hariasih (2023) indicate that hedonic shopping motivation and price discounts trigger impulse buying. The findings of Octaviana & Komariah (2022) further suggest that better price discounts and increasing hedonic shopping motivation correlate with higher levels of impulse purchases, and vice versa.

Therefore, due to the gap in previous research, the researchers are interested in understanding the effect of hedonic shopping motivation and price discounts on impulse purchases. The purpose of this study is to determine the impact of hedonic shopping motivation, price discounts, and impulse purchases on Generation Z consumers during Harbolnas in Bandung.

2. Method

This research is descriptive and verification-based. The unit of analysis comprises several e-commerce platforms in the city of Bandung, including Tokopedia, Shopee, Bukalapak, Lazada, and Blibli. These e-commerce platforms were chosen based on their popularity and high visitation rates in Bandung. The sampling technique employed is purposive sampling. The observation unit consists of Generation Z consumers who enjoy online shopping during Harbolnas in Bandung. The minimum sample size is 100 individuals. Data collection techniques include online questionnaires and interviews. The analytical tool used is multiple linear regression (Ofosu-Boateng, 2020).

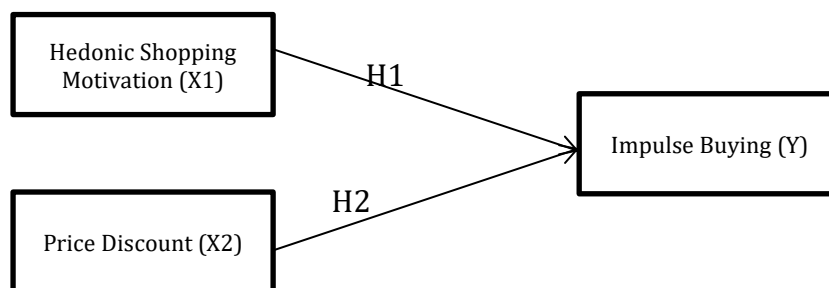


Figure 1: Research model

3. Results

The validity test for all the variable questions studied indicates that the rhit value of each question item is \geq table 0.165, confirming their validity. For the dimension of hedonic shopping motivation, Cronbach's alpha is 0.763; for price discounts, Cronbach's alpha is 0.745; and for impulse purchases, Cronbach's alpha is 0.747. This means that all variable questions studied are reliable, as Cronbach's alpha $>$ 0.70 (Ghozali, 2020).

3.1 Descriptive evaluation

Descriptive analysis through frequency distribution can provide relative and cumulative information about the object of research. Interviewees' responses on hedonic shopping motives (X1), discounts (X2), and impulsive buying (Y).

Table 1: Interviewees' responses

No.	Statements	%	Description
	Hedonic Shopping Motivation		
1	I plan to purchase products during Harbolnas because the discounts offered are appealing	40	Agree
2	I will purchase products offered during Harbolnas, as the prices are very reasonable.	45	Agree
3	I will purchase products during Harbolnas, as the discounts offered are substantial within a short period.	50	Agree
	Price Discount		
1	I plan to purchase products during Harbolnas because the discounts offered are attractive	40	Agree
2	I will purchase products offered during Harbolnas, as the prices are very reasonable	45	Agree
3	I will purchase products during Harbolnas, as the discounts offered are substantial within a short period.	50	Agree
	Impulse Buying		
1	I tend to buy in bulk during Harbolnas when there is a special offer.	49	Agree
2	During Harbolnas, I tend to shop impulsively.	45	Fairly
3	I tend to be obsessed with spending my money on products offered during Harbolnas.	43	Fairly
4	I tend to buy products during Harbolnas that I don't really need.	43	Agree

From the descriptive analysis, it is evident that online shopping can increase the hedonic shopping motivation of consumers in Bandung. This is reflected in the respondents' rankings, which indicate agreement that online shopping can arouse consumers' curiosity and interest in fashion products and make shopping an exciting activity. Online shopping can improve consumers' mood and alleviate boredom. Consequently, consumers will always make time to shop online to keep up with the latest trends and fashions with friends or family.

Respondents' answers indicate that discounts during Harbolnas can encourage consumers to make purchases. This is evident from the ranking of respondents' answers, which shows agreement that price discounts during Harbolnas can motivate consumers to buy products. Consumers perceive that the discounts offered during Harbolnas are substantial within a short period, the prices are very low, and the discount programs are attractive.

Respondents' answers indicate that Harbolnas can encourage impulse buying among Bandung consumers. This is evident from the ranking of respondents' answers, which show agreement with shopping in large quantities during special offers and purchasing products even when they are not really needed. However, consumers generally shop with sufficient forethought and are not overly obsessed with spending their money during Harbolnas.

3.2 Analysis of Multiple Linear Regression

The results of data processing based on SPSS calculations yielded the following multiple regression equations:

Table 2: Multiple Linear Regression Test Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig
	B	Std. error	Beta		
1 (Constant)	2.956	2.707		1.091	.277
Hedonis Shopping Motivation	.498	.095	.479	5.172	.000
Price Discount	.587	.245	.221	2.387	.018

a. Dependent Variable: Impulsive Buying

Source: SPSS data processing results, 2024

From the above table, the following regression equation can be derived:

$$Y = 2,956 + 0,498 X1 + 0,587 X2 + e$$

The constant of 2.956 indicates that in the absence of hedonic purchase motivation and price discounts, impulse purchases will be 2.956. If hedonic shopping motivation increases by 1 unit, while other variables remain constant, impulse purchases will increase by 0.498 units. Similarly, if the price discount increases by 1 unit, while other variables remain constant, impulse purchases will increase by 0.587 units.

3.3 Simultaneous Hypothesis Test (F-test)

The F-test is used to determine the significance level of the combined (simultaneous) influence of the independent variables on the dependent variable. After testing the hypothesis simultaneously, the following results were obtained based on the data processing performed:

Table 3: Hypothesis testing by F-test (F-test) ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig
1 Regression	615.684	2	307.842	31.002	.000
Residual	963.154	97	9.928		
Total	1578,839	99			

a. Dependent Variable: Impulsive Buying

b. Predictors: (Constant), Hedonic Shopping Motivation, Price Discount

Source: SPSS data processing results, 2024

From the table above, it can be seen that the value of $F_{\text{calculated}}$ (31.002) is greater than F_{table} (1.34). Therefore, H_0 is rejected and H_{ais} is accepted, indicating that there is a significant simultaneous influence of hedonic shopping motivation and price discounts on impulse purchases of Generation Z consumers during Harbolnas in Bandung City.

The magnitude of the correlation and the influence of hedonic shopping motivation and price discounts on impulse buying are presented in the following table:

Table 4: Determination Coefficient (R^2) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
.1	.623 ^a	.389	.376	3.150

a. Dependent Variable: Impulsive Buying

b. Predictors: (Constant), Hedonic Shopping Motivation, Price Discount

Based on Table 4, the result of the calculation of the multiple correlation coefficient (R) is 0.623. This value is in the interval 0.600 - 0.799, which means that Hedonic Shopping Motivation and Price Discounts have a fairly strong relationship with Impulse Purchases. The coefficient of determination is 0.389 or 38.9%, which means that Hedonic Shopping Motivation and Price Discounts have an influence of 38.9% on repurchase interest.

4. Discussion

From the descriptive analysis of hedonic shopping motivation, it is evident that online shopping can increase the hedonic shopping motivation of consumers in Bandung. This insight can be valuable for e-commerce entrepreneurs, highlighting the importance of satisfying consumers' needs for self-satisfaction, pleasure, fantasy, social interaction, and emotional fulfillment. Respondents' answers about discounts indicate that the discounts

offered during Harbolnas are generally well-received, although the attractiveness of the discounts received the lowest score. To address this, e-commerce platforms could create more appealing discount programs, such as offering bundling packages by combining several products at a low price (e.g., pairing a best-selling product with a less popular but related product like shoes and socks), special discounts for the first 10 buyers or free shipping, buy one get one free promotions, flash sales with very low prices for a short period (1-2 hours), and cash back discounts limited to a percentage or amount that can be used on subsequent transactions. Additionally, e-commerce platforms could use a variety of unique and different promotional concepts, such as offering discounts based on names or birthdays, or creating interesting promotions using creative videos or unique photos and illustrations.

From the respondents' answers about impulse purchases, it is evident that impulse purchases among consumers in Bandung city during Harbolnas are quite high, with the lowest score for the obsession to spend money during this event. This indicates that many consumers are now more careful and thorough when shopping, realizing that sometimes discounted products do not meet their expectations and that the discounted price may actually be the same as the original price, as some e-commerce platforms increase the product price before applying the discount. Therefore, it is crucial for e-commerce platforms to provide accurate and honest information to consumers when advertising and setting the selling price of discounted products. Statistical test results show that hedonic purchase motivation and discounts significantly affect impulse purchases, consistent with research by Bhakat & Muruganatham (2013), Noor et al. (2020), Octaviana & Komariah (2022), and Shi & Joo (2023), which state that hedonic shopping motivation and price discounts trigger impulse purchases, where better price discounts and increasing hedonic shopping motivation lead to higher impulse purchases.

5. Conclusion

Based on the research carried out by the author through statistical data analysis of distributed questionnaires and interviews, the following conclusions can be drawn: First, the descriptive analysis of hedonic shopping motivation reveals that online shopping can enhance the hedonic shopping motivation of consumers in Bandung, as indicated by respondents' agreement that online shopping stimulates their curiosity and interest in fashion products, making shopping an exciting activity. Online shopping also improves consumers' mood and alleviates boredom, prompting them to regularly shop online to keep up with the latest trends and fashions with friends or family. Second, respondents' answers regarding price discounts show that the discounts offered by e-commerce during Harbolnas are generally well-received, although the attractiveness of the discounts scored the lowest. Third, respondents' answers about impulse buying indicate that impulse buying in Bandung city during Harbolnas is quite high, with the lowest score for the obsession to spend money. Statistical test results show that H_0 is rejected and H_a is accepted, indicating that hedonic shopping motivation and price discounts have a 38.9% influence on impulse buying among Generation Z consumers in Bandung during Harbolnas.

Researchers propose the following suggestions as input for e-commerce entrepreneurs in the city of Bandung: First, e-commerce entrepreneurs should pay more attention to and strive to meet consumers' needs for self-satisfaction, pleasure, fantasy, and social and emotional fulfillment. Second, e-commerce platforms should design more attractive discount programs, such as offering bundled packages, special discounts, buy-one-get-one-free promotions, flash sales, cash back, and unique and different promotions like name or birthday discounts, as well as creating engaging promotional advertisements with creative videos or unique illustrations. Third, e-commerce platforms must provide accurate and honest information to consumers when advertising and setting the selling price of discounted products, ensuring that consumers are more inclined to spend their money during Harbolnas.

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Evaluation of OEM Prioritization to Support the Growth Strategy of PT. Sulzer Indonesia in the >400MW Steam Turbine Product Line

Jonatan Hutahaean¹

¹ Institut Teknologi Bandung

Abstract

This study presents a comprehensive strategy for PT Sulzer Indonesia to expand its presence in the >400MW Steam Turbine market in Indonesia. Employing a mixed-method approach, the research combines qualitative interviews with six industry experts and quantitative Analytic Hierarchy Process (AHP) analysis to identify key success factors and prioritize Original Equipment Manufacturers (OEMs) for strategic marketing focus. The findings highlight the critical importance of market viability, particularly market accessibility, along with competitive advantages such as technological fit and strong engineering capabilities. The AHP analysis reveals Mitsubishi Hitachi Power Systems, Toshiba Energy Systems and Solutions, and GE Vernova as the top-ranked OEMs as potential focused market. A 12-month implementation plan is proposed, structured into six phases: preparation and assessment, planning and design, initial implementation, expansion, and refinement, further implementation, and evaluation and optimization. This plan emphasizes continuous learning, adaptability, and strategic alignment, drawing on established management theories and industry best practices. The study concludes that by focusing on these prioritized OEMs and following the proposed implementation plan, PT Sulzer Indonesia can effectively capitalize on the growing opportunities in the >400MW Steam Turbine market, leveraging its strengths while addressing challenges in resource alignment and market penetration. This research provides PT Sulzer Indonesia with a theoretically grounded and practically applicable roadmap for achieving sustainable growth and competitive advantage in this critical market segment.

Keywords: Original Equipment Manufacturers (OEMs), Analytic Hierarchy Process (AHP), Market Viability, Competitive Advantage, Strategic Partnerships, Implementation Plan, Market Penetration

1. Introduction

Steam turbines are integral to power generation, efficiently converting thermal energy from steam into mechanical energy (Gu et al., 2020). The >400MW steam turbine category, designed for large-scale power generation, represents a critical segment in the expanding global energy market. Projections indicate substantial growth in this sector, with the steam turbine market for power generation expected to increase from USD 15.45 billion in 2024 to USD 18.34 billion by 2029, at a compound annual growth rate (CAGR) of 3.49% (Mordor Intelligence, 2020). This growth trajectory underscores significant opportunities for businesses to expand into advanced steam turbine technologies. However, such expansion requires careful consideration of factors like absorptive capacity (Zahra & George, 2002), expansion speed (Hashai et al., 2018), and the impact of market orientation on innovation and new product performance (Carbonell & Rodríguez Escudero, 2010).

PT. Sulzer Indonesia, established in 1994, has positioned itself as a leading Maintenance, Repair, and Overhaul (MRO) company specializing in servicing rotating industrial machinery. With advanced facilities in Purwakarta and Balikpapan, the company offers comprehensive shop and field engineering services across diverse industrial sectors, including power generation, oil and gas, and mining. These services encompass the re-manufacturing, repair, upgrading, and reconditioning of various equipment, from combustion turbines to electrical motors (Sulzer, 2021, 2022, 2023). Despite its strong reputation and diverse capabilities, PT. Sulzer Indonesia has faced challenges in recent years, evidenced by fluctuating revenues and a notable decline in its steam turbine product line, particularly from 2022 to 2023.

The steam turbine aftermarket in Indonesia presents a substantial opportunity, with an estimated size of USD 270 million (YCP Solidiance Research and Analysis, 2022). Within this, the high-capacity segment, which includes >400MW steam turbines, constitutes USD 158 million, with promising growth figures of 6.0% and 1.1% in the Independent Power Producer (IPP) and state-owned power generation company (PLN) segments, respectively. Currently, PT. Sulzer Indonesia's steam turbine services are predominantly focused on units below 400MW, which have seen declining sales. This concentration on a declining segment underscores the need for strategic diversification to ensure future growth and mitigate risks. The company is thus considering expanding its product line to include servicing >400MW steam turbines, a move that aligns with market trends and growth potential.

In the Indonesian market, there are 34 units of >400MW steam turbines installed and operational, with the top 5 Original Equipment Manufacturers (OEMs) constituting 79% of the population. This market concentration presents both opportunities and challenges for PT. Sulzer Indonesia as it looks to penetrate this market segment. The company must carefully assess various factors, including OEM relationships, customer dynamics, and its own capabilities, to develop an effective strategy for entering and growing in the >400MW steam turbine category. This assessment should consider the complex ecosystem of manufacturing and maintenance in the steam turbine industry (Ding & Sheng, 2010; Emonts et al., 2022), the importance of partnerships with OEMs and other MRO providers (Vieira & Loures, 2016), and the strategic implications of OEM agreements and private-label supplying (Caldieraro, 2016).

This research aims to address key questions regarding PT. Sulzer Indonesia's expansion into the >400MW steam turbine market. These include identifying criteria for prioritizing target OEMs, developing strategies to gain market share and drive revenue growth, and outlining key initiatives for penetrating and growing within specific OEMs in the Indonesian market. The study will consider various factors in OEM selection and prioritization, including technological advancements, competitive offerings (Debo et al., 2005; Örsdemir et al., 2014), social compliance standards, lead-time efficiency, product reliability (E. Lee, 2006), and reputation (Manello & Calabrese, 2019). By addressing these questions, the study seeks to establish a list of target OEMs and develop tailored marketing implementation plans for prioritized OEMs in the context of the Indonesian market. This strategic approach aims to enhance PT. Sulzer Indonesia's competitive positioning and leverage the benefits of collaboration to drive growth in the dynamic >400MW steam turbine market.

2. Literature Review

2.1 Market Segmentation and Penetration

Customer segmentation is a powerful analytical tool used in formulating marketing strategies, focusing on historical data to understand the existing customer base (Storbacka, 1997). It involves dividing the market into distinct subsets of customers with similar characteristics and behaviors (Fonseca & Cardoso, 2007). This practice enables businesses to identify and target profitable segments, offering tailored products and services to meet their common, yet dynamic needs. Behavioral segmentation, which involves dividing a market based on consumer behavior such as search patterns and benefits sought, is particularly effective in mature industrial markets (Hsu et al., 2006; Rangan et al., 1992).

Market penetration is a key strategy for companies aiming to expand their market share and reach. It involves tactics such as penetration pricing, product enhancements, and effective promotional activities (Suder et al., 2022).

The success of market penetration strategies can be influenced by factors including demographics, pricing strategies, product differentiation, and the competitive landscape (Ganesan-Lim et al., 2008). Research indicates that the effects of market penetration can vary under different circumstances, with high market penetration of certain products potentially encouraging increased adoption of similar products or reducing adoption of competing products (Heutel & Muehlegger, 2015).

2.2 Strategic Fit and Resource-Based View

Strategic fit refers to the extent to which an organization's strategy matches its internal capabilities and external environment (Rashidirad, Soltani, & Salimian, 2015). The concept of strategic fit has been emphasized by numerous authors, with Schilling (2017) arguing that a company's success depends on its ability to create a unique and valuable position based on a set of activities that fit together and reinforce each other. Eckardt and Skaggs (2018) suggest that strategic fit is a dynamic concept requiring continuous adaptation to changes in the environment.

The Resource-Based View (RBV) is a significant framework in strategic management that emphasizes the critical role of a firm's internal capabilities and resources in securing a sustainable competitive advantage (Barney, 2001). The RBV posits that firms can achieve sustainable competitive advantage by possessing resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). This perspective has been widely applied across various business strategies and contexts, including marketing, supply chain management, and overall business strategy formulation (Peng, 2001). In the context of product development, the RBV highlights the impact of functional and integrative capabilities on process efficiency and product effectiveness (Verona, 1999).

2.3 Market-Based View and Decision-Making Theory

The Market-Based View (MBV) emphasizes the importance of external market conditions and industry factors as primary influencers of a firm's competitive advantage and overall performance. This "outside-in" perspective prioritizes the analysis of competitive environments and market trends, guiding firms to align their strategies accordingly. At the core of MBV is the concept of market orientation, which posits that a firm's ability to gather, disseminate, and respond to market information constitutes a significant competitive edge.

Decision Making Theory is crucial in understanding how organizations navigate complex strategic choices in a competitive environment. It elucidates the cognitive and rational processes involved in selecting optimal strategies to achieve organizational goals. Decision Theory explores rationality in risk situations, focusing on three main areas: the normative status of the subjective expected utility model, dynamic decision making, and its importance in game theory (Conitzer et al., 2021). The theory can be applied in various forms - normative, descriptive, and prescriptive - each offering different insights into the decision-making process (Hansson & Grüne-Yanoff, 2018). By considering insights from these various perspectives on Decision Making Theory, organizations can develop a more holistic and evidence-based approach to evaluating and selecting the most suitable strategies for their needs and objectives.

3. Method

3.1 Research Design

This study employs a mixed-method approach, combining qualitative and quantitative data collection and analysis techniques. The research design incorporates problem identification through SWOT analysis and Porter's Five Forces, followed by data collection using interviews, focus group discussions, and an Analytic Hierarchy Process (AHP) survey. This comprehensive approach allows for a thorough examination of the factors influencing PT. Sulzer Indonesia's strategy in the >400MW Steam Turbine category. The qualitative phase involves gathering insights from stakeholders to understand the market dynamics and identify key criteria for OEM selection. The quantitative phase utilizes the AHP methodology to prioritize these criteria and evaluate potential OEM targets.

This mixed-method design enables a robust analysis of the complex decision-making process involved in expanding PT. Sulzer Indonesia's product line and market share.

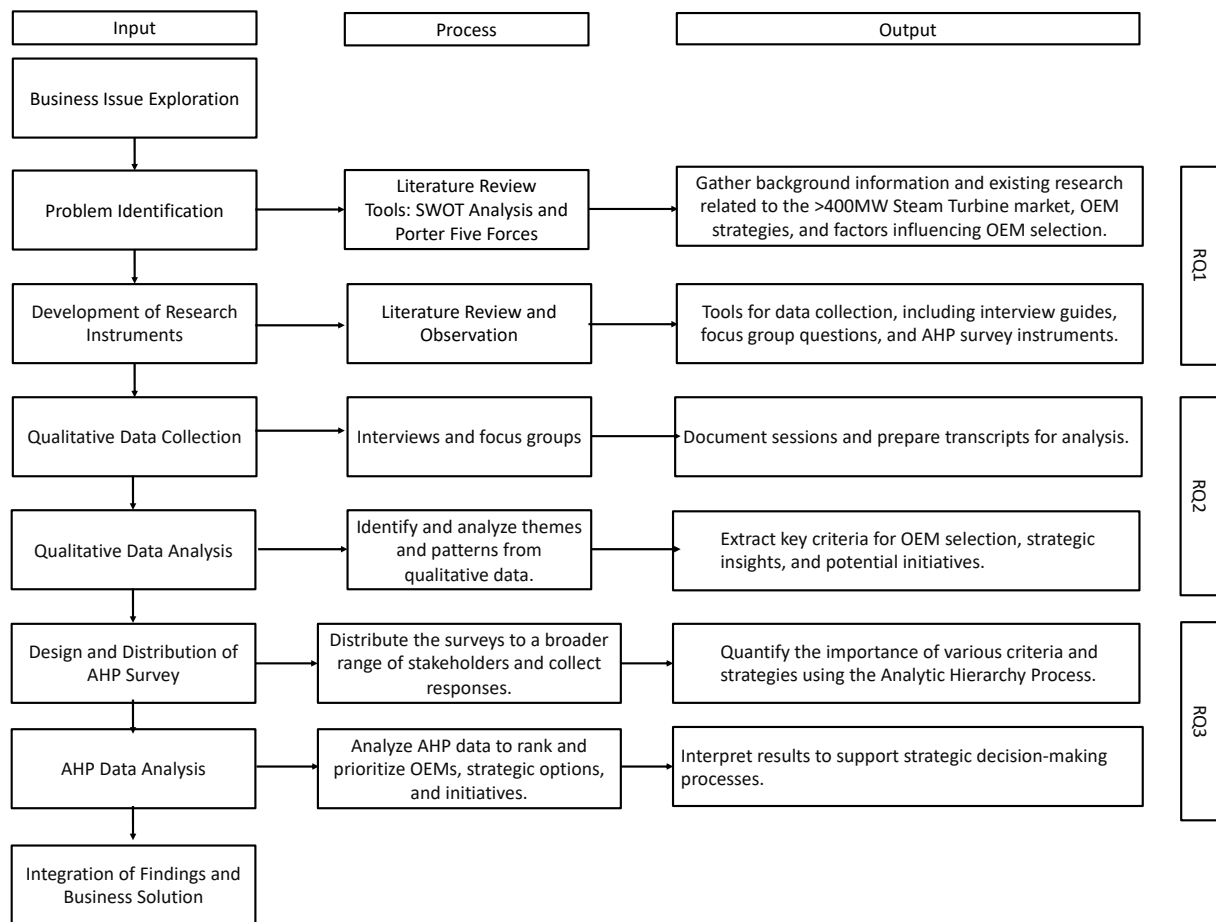


Figure 1: Research Design

3.2 Data Collection

Data collection for this study occurs between June 1, 2024, and July 31, 2024, utilizing various methods to ensure comprehensive coverage of the research objectives. Qualitative data collection includes semi-structured interviews with key stakeholders, lasting 45-60 minutes each; non-participant observations at the company premises, conducted in two-week intervals; and document analysis of relevant company reports, memos, and meeting minutes. Quantitative data collection focuses on the AHP survey, which involves distribution of AHP questionnaires to a panel of experts in the field, a two-week period in June for questionnaire completion, followed by a one-week follow-up period in July for clarifications, and consistency checks on the completed AHP questionnaires to ensure validity of the judgments. This multi-faceted data collection approach ensures a rich dataset for analysis, combining in-depth qualitative insights with quantifiable AHP data.

3.3 Data Analysis

The data analysis process is divided into qualitative and quantitative components. For qualitative analysis, thematic analysis is employed to identify, analyze, and report patterns within the qualitative data. This process follows six phases as outlined by Braun & Clarke (2006): familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Strategies such as triangulation, member checking, and reflexivity are used to ensure the trustworthiness and credibility of the findings. The quantitative analysis (AHP) involves structuring the decision problem into a hierarchical model, making pair-wise

comparisons and obtaining the judgmental matrix, computing local weights and checking the consistency of comparisons, and aggregating local weights to determine final weights of decision alternatives. The AHP analysis focuses on evaluating OEMs based on criteria including Market Viability, Competitive Advantage, Strategic Alignment, and Resource Alignment, with each criterion further divided into sub-criteria to provide a comprehensive evaluation framework. This combined analysis approach allows for a thorough examination of both qualitative insights and quantitative priorities, supporting PT. Sulzer Indonesia in making informed decisions regarding OEM targeting and market expansion strategies.

4. Results

4.1 Qualitative Result

The qualitative analysis conducted for PT Sulzer Indonesia's strategy in the >400MW Steam Turbine category was based on in-depth interviews with six key industry experts. These interviews provided valuable insights across five main themes: OEM Brand Selection, Market Viability, Competitive Advantage, Resource Alignment, and Strategic Alignment. The analysis revealed the importance of focusing on high-volume OEM brands like Mitsubishi and Toshiba, prioritizing non-Chinese OEMs due to supply chain considerations, and targeting older units with higher repair potential. Key competitive advantages identified include flexibility, fast response times, and strong engineering capabilities. The experts emphasized the need for continuous customer engagement, investment in advanced equipment, and development of specialized technical advisors. Strategic recommendations included partnering with O&M companies, leveraging Sulzer's global network, and adopting a phased approach to building customer trust. These findings provide a comprehensive foundation for PT Sulzer Indonesia to refine its strategy and expand its market share in the >400MW Steam Turbine segment.

Table 1: Interview Result (One of the Samples)

Main Theme	Key Variables	Sub-variables	Quotation Example
OEM Brand Selection	Relationships	Good relationships with OEMs and end-users	"With my good relationship with Mr. Giyanto, who represents Paiton and POMI, I get more information and they are more open."
	Market Accessibility	Direct access to customers	"The most important thing is market accessibility. We need access to customers and we need to play there."
		Focus on high-volume brands	"First, we need to consider population. There are only 34 large machines, and two brands (Toshiba and Mitsubishi) account for over 50% of them."
Market Viability	Technological Fit	Adaptability of technology across OEMs	"No issues generally, but extensive repairs for Chinese OEMs can be more challenging."
	Supply Chain	Challenges with Chinese OEMs	"The challenge is in the supply chain for Chinese OEMs."
	Strategic Targeting	Prioritize non-Chinese OEMs	"Non-Chinese OEMs might be more feasible to target initially."
		Target older units	"When the unit is more than 15 years old, more than 20 years, there is a greater potential for repair compared to a unit that is only 2 years old."
Competitive Advantage	Customer Engagement	Building trust through continuous contact	"Customers need to be confident in our capabilities. Continuous engagement is essential to build this confidence."
	Competitive Strategy	Flexibility and fast response	"Flexibility and fast response are key competitive advantages."
		Strong engineering capabilities	"Strong engineering capabilities and global network support are crucial."

Main Theme	Key Variables	Sub-variables	Quotation Example
Resource Alignment	Branding	Enhancing reputation through market penetration	"Brand reputation improves through precise market penetration. Regular contact with customers instills trust and brand recall."
	Equipment Investment	Investing in advanced tools and portable equipment	"Investment in portable equipment and tooling can enhance service delivery."
	Market Segmentation	Targeting based on regional characteristics	"Understanding customer characteristics by region (e.g., cost sensitivity in Vietnam vs. quality focus in Australia) is crucial."
Strategic Alignment	Talent Management	Developing Technical Field Advisors	"We need to develop a pool of Technical Field Advisors (TFAs) from the market who are experienced with the specific OEM brands we target."
	Collaborative Strategy	Retaining skilled employees	"Employee retention is crucial as competitors may try to poach skilled workers."
		Partnering with O&M companies	"Partnering with O&M companies can facilitate market entry."
		Leveraging global network	"If necessary, we can get support from our global network."
		Phased approach to building trust	"Building trust with customers by gradually supplying consumables before moving on to capital parts."

4.2 AHP Results

Based on the AHP analysis for OEM selection in the >400MW steam turbine category, Market Viability emerged as the most critical factor with a weight of 38.2%, followed by Competitive Advantage (28.3%), Resource Alignment (23.9%), and Strategic Alignment (9.6%). Within Market Viability, Market Accessibility (56.9%) was identified as the most crucial sub-criterion. For Competitive Advantage, Technology Fit (41.3%) received the highest priority. Strategic Alignment emphasized Potential for Strategic Partnership (67.7%), while Resource Alignment heavily prioritized Resource Availability (81.8%). These results demonstrate a high group consensus (85.5%) with a Consistency Ratio of 1.2%, indicating reliable and consistent evaluations. This prioritization provides a clear framework for PT Sulzer Indonesia in determining and targeting the most promising OEMs for the >400MW steam turbine product line, with a primary focus on market accessibility, technological fit, and resource availability.

Table 2: Pairwise Comparison of Criteria and Sub-Criteria

Decision Hierarchy			
Level 0	Level 1	Level 2	Glb Prio.
OEM Selection	Brand	Market Size 0.285	10.9%
		Market Viability 0.382	5.6%
		Market Accessibility 0.569	21.7%
	Competitive Advantage	Technology Fit 0.413	11.7%
		Innovative Capability 0.194	5.5%

	Competitive Position	0.393	11.1%	
		Alignment with Long-Term Goals	0.323	3.1%
	Strategic Alignment	Potential for Strategic Partnership	0.677	6.5%
		Resource Availability	0.818	19.6%
	Resource Alignment	Scalability	0.182	4.3%
		1.0		

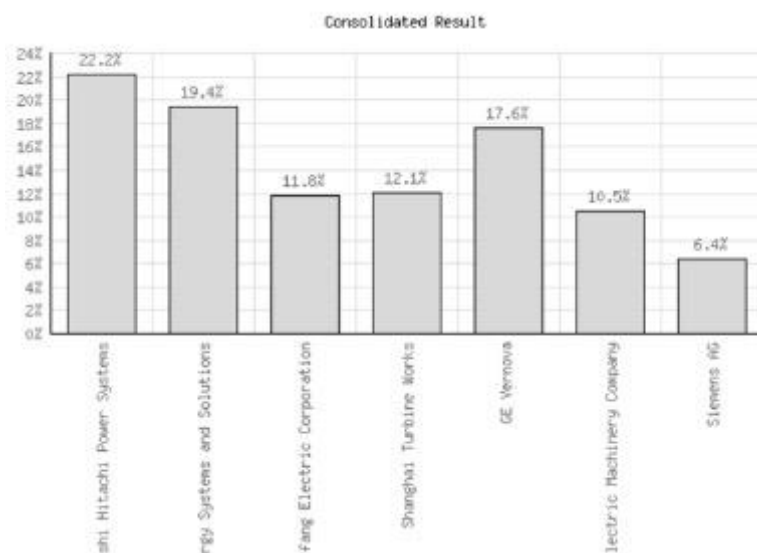


Figure 2: OEMs Consolidated Result

Based on the AHP analysis for OEM selection in the >400MW steam turbine category in Indonesia, Mitsubishi Hitachi Power Systems (MHPS) emerged as the top candidate with a total priority score of 22.2%. MHPS excels particularly in Market Viability, leading in both Market Size (0.325) and Market Growth (0.243). Its strong market presence is complemented by significant technological strengths, as indicated by high scores in Technology Fit (0.236) and Innovative Capability (0.235). MHPS also demonstrates solid Resource Availability (0.203), ensuring the capability to support extensive projects. The company's strong position is further reinforced by its growing number of >400MW Steam Turbines in Indonesia, including recently commissioned units and established relationships with key players like Paiton Energy.

Toshiba Energy Systems and Solutions ranks second with a priority score of 19.4%, showing substantial potential particularly in Resource Availability (0.279) and market strength (Market Size: 0.249, Market Growth: 0.232). Toshiba has been expanding its >400MW installed base in Indonesia with newly commissioned units and established installations. PT Sulzer Indonesia's recent success with Toshiba steam turbines in Vietnam and its experience with 43 Toshiba steam turbines since inception provide a strong foundation for further engagement with this OEM.

GE Vernova secured the third position with a total priority score of 17.6%, demonstrating strength in Strategic Partnership (0.334). While GE Vernova has fewer >400MW steam turbines in Indonesia compared to Mitsubishi and Toshiba, PT. Sulzer Indonesia's relationship with Paiton Energy and the aging of existing units present

opportunities for PT Sulzer Indonesia. The company's experience with Toshiba steam turbines, which share design similarities with GE units, positions PT Sulzer Indonesia well to address the GE >400MW steam turbine market. Other OEMs, including Shanghai Turbine Works, Dongfang Electric Corporation, Harbin Electric Machinery Company, and Siemens AG, received lower priority scores but each present unique strengths and opportunities for strategic partnerships or market entry strategies.

4. Discussion

Table 3: Implementation Plan

Phase	Activity	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Preparation and Assessment	Establish steering committee												
	Conduct detailed market analysis												
	Review market analysis results												
	Develop prioritization framework												
Planning and Design	Design tailored engagement strategies												
	Develop marketing and branding plans												
	Select CRM system												
	Finalize strategic partnership strategies												
	Design technical training programs												
Initial Implementation	Roll out new organizational structure												
	Launch Center of Excellence												
	Implement project management software												
	Start first round of technical training												
	Initiate leadership development program												
	Pilot matrix structure in selected departments												
	Launch e-learning platform												
Expansion and Refinement	Extend new organizational structure												
	Launch cross-functional teams												
	Implement digital collaboration tools												
	Start second round of technical training												
	Introduce mentoring and job rotation programs												
	Implement performance tracking system												
	Conduct first review of organizational changes												
Continued Implementation	Launch innovation initiatives												
	Start advanced project management and leadership training												
	Begin professional development initiatives												
	Start data center operations training												
	Form Diversity and Inclusion committee												
	Implement knowledge-sharing platform												
	Start third round of technical training												
Evaluation and Optimization	Conduct thorough evaluation of implemented changes												
	Gather feedback and analyze performance metrics												
	Develop optimization plan based on evaluation results												
	Refine organizational structures and programs												
	Plan next phase of competency development initiatives												
	Hold celebration to honor key contributors												

The implementation plan for PT Sulzer Indonesia's strategy to target the >400MW Steam Turbine market is structured as a comprehensive, phased approach over 12 months. The initial phase, spanning the first two months, focuses on preparation and assessment. This critical stage involves establishing a dedicated steering committee to oversee the project and ensure alignment with strategic objectives, a practice recommended by Kotter (1995) for successful organizational change. Concurrently, detailed market analyses will be conducted for each targeted OEM, particularly focusing on major players like Mitsubishi Hitachi Power Systems and Toshiba Energy Systems and Solutions. This thorough market analysis aligns with Porter's (1980) emphasis on understanding industry structure and competitive forces. The results will be used to develop a prioritization framework for OEM targets, based on market feasibility, competitive advantage, resource alignment, and strategic alignment, reflecting the multi-dimensional approach suggested by Barney (1991) in his resource-based view of the firm.

The subsequent two months will be dedicated to planning and design, shifting focus to strategic planning and engagement strategies. This phase includes developing customer engagement strategies for top-ranked OEMs, enhancing marketing and branding efforts, and selecting a customer relationship management (CRM) system. The importance of such strategic planning is underscored by Mintzberg (1994), who argues that strategic thinking is essential for organizational success. Additionally, strategies for building partnerships with key Operations and Maintenance (O&M) companies and suppliers will be finalized, reflecting the importance of strategic alliances in competitive markets (Doz & Hamel, 1998). A detailed training and technical development program will also be designed, focusing on expertise related to Mitsubishi and Toshiba units, aligning with the concept of developing core competencies as advocated by Prahalad and Hamel (1990).

The fifth and sixth months mark the beginning of initial implementation. This phase includes rolling out a new organizational structure, launching a Center of Excellence, and implementing project management software. These actions align with Galbraith's (2014) star model, which emphasizes the importance of aligning organizational structure with strategy. The first round of technical training programs will commence, focusing on mechanical and electrical systems, reflecting the importance of continuous learning in maintaining competitive advantage (Senge, 1990). A leadership development program will also be initiated, and a matrix structure will be piloted in selected departments, an approach that can enhance organizational flexibility and responsiveness (Davis & Lawrence, 1977).

Months seven and eight will focus on expansion and refinement, building on the initial implementation efforts. The new organizational structure will be extended to all departments, and cross-functional teams for key projects will be launched, aligning with the concept of horizontal organization proposed by Ostroff (1999). Digital collaboration tools will be implemented across the company, reflecting the growing importance of digital transformation in modern organizations (Westerman et al., 2014). A second round of technical training will begin, focusing on control systems and water management. Mentoring and job rotation programs will be introduced, and a performance tracking system for new competencies will be implemented, aligning with best practices in talent management and development (Cappelli, 2008).

The ninth and tenth months will concentrate on further implementation and embedding new practices. This phase includes launching innovation initiatives through the Centre of Excellence and initiating advanced project management and leadership training programs. These actions align with the concept of creating a learning organization (Garvin, 1993) and fostering innovation culture (Christensen, 1997). A Diversity and Inclusion committee will be formed, reflecting the growing recognition of the importance of diversity in driving organizational performance (Hunt et al., 2015). A knowledge-sharing platform will be implemented, and a third round of technical training will begin, focusing on rotating equipment and instrumentation, further reinforcing the company's commitment to continuous learning and improvement.

The final two months will be dedicated to evaluation and optimization. This phase involves a thorough evaluation of all implemented changes, including gathering feedback from employees and analyzing performance metrics. This aligns with the concept of double-loop learning proposed by Argyris (1977), which emphasizes the importance of questioning underlying assumptions and strategies. An optimization plan will be developed based on the evaluation results, and the organization's structure and programs will be refined. This continuous

improvement approach reflects the principles of Total Quality Management (Deming, 1986) and the importance of adaptability in dynamic business environments (Teece et al., 1997). The implementation plan concludes with planning the next phase of competency development initiatives and celebrating the transformation, recognizing the importance of both continuous improvement and acknowledging achievements in organizational change efforts (Kotter & Schlesinger, 2008).

5. Conclusion

In conclusion, this study provides a comprehensive strategy for PT Sulzer Indonesia to expand its presence in the >400MW Steam Turbine market in Indonesia. Through a mixed-method approach combining qualitative interviews and quantitative AHP analysis, the research identified key factors for success in this market segment. The findings highlight the importance of market viability, particularly market accessibility, as well as competitive advantages such as technological fit and strong engineering capabilities. The study recommends prioritizing its marketing plan to focus on top-ranked OEMs, specifically Mitsubishi Hitachi Power Systems and Toshiba Energy Systems and Solutions, while also considering strategic opportunities on GE Vernova installed base. The proposed 12-month implementation plan provides a structured approach to realizing these strategies, emphasizing the need for continuous learning, adaptability, and strategic alignment. By following this plan, PT Sulzer Indonesia can position itself to capitalize on the growing opportunities in the >400MW Steam Turbine market, leveraging its strengths in engineering and customer relationships while addressing challenges in resource alignment and market penetration. This strategic approach, grounded in both theoretical frameworks and practical industry insights, offers PT Sulzer Indonesia a roadmap for sustainable growth and competitive advantage in this critical market segment.

Author Contributions: Jonatan Hutahaean conceptualized the study, developed the methodology, conducted the formal analysis, and wrote the original draft of the manuscript. Pri Hermawan supervised the research, provided critical review and contributed to the validation of results. Both authors were involved in the investigation process, data curation, and the interpretation of findings. Jonatan Hutahaean was responsible for project administration and the visualization of data. Both authors reviewed and approved the final version of the manuscript. The research was conducted under the auspices of the School of Business and Management, Institut Teknologi Bandung, Indonesia, with Jonatan Hutahaean serving as the corresponding author for this study.

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Informed Consent Statement/Ethics approval: All participants have fully informed if the anonymity is assured, why the research is being conducted, how their data will be used and if there are any risks associated.

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Literature Review on Digitalization and Financial Performance

Robbie Kurniawan Winata¹, Subiakto Soekarno²

^{1,2} School of Business and Management, Institut Teknologi Bandung, Indonesia

Correspondence: Robbie Kurniawan Winata, School of Management, Institut Teknologi Bandung, Indonesia.
Tel: +6281333624619. E-mail: robbie_kw@sbm-itb.ac.id

Abstract

The purpose of this study is to summarize research on digitalization and emphasize how it affects financial performance. Additionally, applicable methodology from recent studies in a variety of domains is shown in this study. The state-of-the-art in digitalization research is described in this review article, which combines technology, finance, marketing, and innovation literature. In recent years, research on digitalization has expanded rapidly in a number of domains, employing both qualitative and quantitative techniques. The elements that affect an organization's financial performance as a result of its digitalization—such as big data analytics, cloud computing, artificial intelligence, process automation, the Internet of Things (IoT), computer simulations, and online technology—have been the subject of more recent studies. Even if studies on digitalization have been more popular over the past five years, adding new dimensions and investigating qualitative methods remain fascinating areas of study. For academics who are unfamiliar with digitalization, this article provides an overview of how to explore the process. The article enhances the review of the impact of digitization on financial performance.

Keywords: Digital Maturity, Digital Transformation, Financial Performance, Indonesia, Literature Review, Organization

1. Introduction

As the fourth digital wave picks up speed, data-driven digital technologies are starting to alter how firms function, invest, and even organize (Chen & Srinivasan, 2019). Features like cloud computing, big data, AI, machine learning, and automation are examples of data-driven digital technologies. In the global economy, the aforementioned digital technologies are becoming more and more common. Furthermore, the development of information technology has altered societal evolution and people's way of life. The idea of digitalization has likewise evolved from a little, far-off concept to a ground-breaking, real-world vision. It also seriously disrupts practically every worldwide industry (Bughin et al., 2017; Schwab, 2017).

The digital era began in the 1990s with the development of information technology. Because of information inequality at the time, the digital gap began to separate things according to the calibers of the information they carried (Yoo, 2013). Furthermore, the term "digitalization" no longer refers to using computers; rather, it now frequently refers to the idea that using digital technology has an impact on how individuals or organizations engage with their customers (Loonam et al., 2018). According to Gimpel & Röglinger (2015), digital technology use has

resulted in a paradigm change that has a significant impact on all facets of existence, including individual lives, human civilization, and even the most traditional organizations. These occurrences demonstrate how consumers are greatly impacted by digitalization and its products. (Brynjolfsson & McAfee, 2014).

Not only do consumers and tech-based firms benefit from the usage of digital technology, but non-tech corporations have also been won over by other purportedly important advantages (Weill & Woerner, 2018). Even some non-tech companies have chosen to break with their status quo and widely implement digital technology due to the overwhelming public attitude that favors digitalization (Bass, 2018). Furthermore, the need for consumer data is a major factor in non-tech companies' use of digital technology, as data is today considered the most valuable asset a company can own (Sadowski, 2019). The rapid adoption of digital technology is becoming more and more necessary as a result of the systemic consequences of digitalization on customers and trade.

Trends in digital technology have impacted not just three or four distinct locations but the entire planet. According to BBVA Research's Multidimensional Index of Digitization (2018), Since 2018, developed countries such as Singapore, Luxembourg, the United States, Hong Kong, and the Netherlands have acknowledged the importance of advanced digital technology. Emerging nations still have a lot of digital potential, even though they are now stuck in a digital rut. These circumstances in poor countries are caused by problems with logistics and human resource readiness, which exacerbates the digital divide among the people living there (UNCTAD, 2018). One of the largest developing nations, Indonesia, offers enormous promise in the field of digital technology. They came up with a bold goal to surpass the top digital economy in ASEAN by 2020 (Das et al., 2016). Although Indonesia has not yet entered the digital revolution, it is possible and approaching even more swiftly than countries like South Korea (Barquin et al., 2019). According to Barquin et al. (2019), up to one-third of the businesses in Indonesia's commerce sector have used digital technologies. Since almost all Indonesian firms view digital technology as a vital tool for future planning, it is anticipated that the numbers will rise in the years to come. It demonstrates how digitization is spreading and is set to become a trend that will alter how companies run.

Despite popular belief, putting digital technology into practice comes at a price. Opportunity costs are inescapable since investing in digital technology requires organizations to make financial sacrifices. It is undeniable that these investments are not cheap, even in spite of claims that it is more costly for a business to stick with the status quo and avoid going digital (Dery, 2018). According to ASEAN research conducted in 2020 in Indonesia, 73% of Indonesian businesses think adopting digital technology will be extremely costly. To afford digital technology, Indonesian enterprises need to invest anywhere from USD 500,000 to USD 5 million (Indonesia Data Corporation, 2019). Businesses should invest this much in integrating digital technology into their operations, but there's no guarantee that they will be successful, which adds to the uncertainty for these companies (Forbes, 2019).

A few large Indonesian publicly traded corporations have begun adopting digital technologies since the 2010s. Including digital technologies in their value chains is their goal. Companies also follow the trends, even when they require them to make large upfront investments. MNC Group, which has been using cutting-edge digital technologies since the 2010s, is one example of this. Big data analytics and artificial intelligence have also been adopted by other major corporations, such as PT Telekomunikasi Indonesia (Persero) Tbk, in order to improve customer experience. These public companies are encouraged to spend so much money on these technologies because they can afford to do so.

Additionally, they believe that investing in new technologies and making the necessary sacrifices is a short-term commitment that will ultimately improve their performance and prospects. Due to the fact that companies listed on the Indonesian capital market are still becoming used to the digital age, it does not apply to all publicly traded companies in Indonesia. The circumstances suggest that some companies have not yet embraced digital technology or are still in the process of exploring it. (Otoritas Jasa Keuangan, 2019).

Evaluating how well a business or organization is implementing digital transformation is still growing more difficult. Academic institutions and consulting organizations are making measurements of digital transformation. For instance, digital maturity, according to Deloitte and MIT Sloan, is about a company adjusting to compete in an increasingly digital environment effectively (Kane et al., 2017). As a result, it's a never-ending process. Digital

maturity, according to BCG and other organizations, is a gauge of a business's capacity to generate value from its digital assets (BCG, 2020). It is also a crucial success factor for businesses undergoing digital transformation. In conclusion, the term "digital maturity" was created to describe a business's capacity and willingness to adapt and use cutting-edge technology in line with market trends in order to stay competitive (Eremina, Lace, & Bistrova, 2019).

Previous studies indicate that there hasn't been a lot of scholarly research done on this topic worldwide. According to Wroblewski (2018), there is a shortage of research in this field, which leaves businesses even less certain about whether access to digital technology or a company's "digital maturity" will positively affect its bottom line. There has never been a solitary empirical study conducted in Indonesia. For certain companies, the number of case studies is limited. Considering the increasing use of digital technology in Indonesian public enterprises, this study aims to determine whether the digital maturity of these organizations enhances their financial performance. The main rationale for the decision is the presence of digital technology in certain Indonesian state-owned enterprises. There are possibilities to make sure they have benefited from the use of these technologies. A summary of the relationship between a company's degree of digital maturity and its financial success will come from an empirical examination of this matter.

As a result of its successful efforts to get certain public firms to engage in digital technology, Indonesia is becoming a more digitally mature nation (McKinsey & Company, 2019). Some organizations are still considering making these investments despite the fact that 73% of Indonesian businesses view them as extremely costly (Epson ASEAN, 2020). Some people are also hesitant to engage in this new technology because of the many uncertainties they bring to their organizations (Forbes, 2019). The lack of practical studies and the scarcity of foreign academic research on the effects of digital maturity on the financial performance of Indonesian enterprises further contribute to the uncertainty. Given that Indonesia aims to be the largest digital economy in ASEAN, it is interesting to find out if a company's digital maturity supports its financial performance metrics, particularly profitability, sales growth, and stock performance (Das et al., 2016; Chen & Srinivasan, 2019; Eremina et al., 2019). The study's outcome and findings might also give publicly traded businesses that are still unsure about using digital technologies a general overview.

Additionally, they might be able to assist these businesses in projecting future outcomes for financial performance indicators like profitability, sales growth, and stock return when they advance their degree of digital maturity. In order to address the challenges, the aims of these outcomes are developed once the backdrop and problem identification have been explored. This study aims to ascertain whether, in contrast to popular opinion, Indonesian public firms' digital maturity has a substantial influence on their financial performance assessments.

2. Literature Review

2.1. Digital Maturity

When a business chooses to become digital, it goes through a process known as digital maturity, which is the slow process of the business adjusting to its new digital competitive environment (Kane, 2017). Making the company more competitive and agile in comparison to its contemporaries in the market and industry is the main goal. The amount of digital activity that the company discloses quantifies its level of digital maturity. One of the key differentiators in corporate rivalry is now the firm's digital element, which is driven by IT deployment (Manyika et al., 2015). As a result, in order to stay up with the trends, more businesses will be spending money and resources to increase their degree of digital maturity. Six widely used technologies can be used to test various aspects of digital maturity: big data analytics, cloud computing, artificial intelligence, process automation, the Internet of Things (IoT), computer simulations, and online technology (Sebastian et al., 2017). There are more dimensions, like internet technologies (Eremina et al., 2019).

2.1.1. Big Data and Data Analytics

Chen et al. (2012) defined big data as a set of huge, complicated data that need specialized storage, management analysis, and visualization tools. Analytical technologies known as big data analytics, or just data analytics, are

employed in the management of large amounts of data. The main goal of big data analytics is to increase the caliber of products and services that companies offer through the use of information and communication technology systems, as well as to streamline corporate procedures and increase their effectiveness (Loebbecke & Picot, 2015; Majchrzak & Malhotra, 2013; Spanos et al., 2002). Companies can anticipate current patterns and project future trends based on historical and supplementary data that they have saved, thanks to the availability of information and data. Because consumer behavior is so easily monitored and analyzed, businesses are able to provide personalized advertising campaigns and get to know their customers better. Walmart is one example of a company that uses big data analytics to optimize inventory costs by analyzing consumer behavior to estimate their requirements for inventory levels at any time of the year (Walker, 2015).

2.1.2. Cloud Computing

According to Surbiryala & Rong (2019), cloud computing is a model that allows users to easily, endlessly, and whenever they want to access a shared pool of computer resources over the network. First and foremost, because cloud computing is internet-based, it can be instantly scaled to the specific needs of each firm. As a result, the business may easily scale back or up the amount of storage that the cloud offers with only a small bottleneck. Second, they stand out because they use a pay-as-you-go method that lets them pay only for the services they actually use, increasing the data storage system's cost-effectiveness. Thirdly, by doing away with physical hardware infrastructure that would make it more difficult to add or remove more analytical techniques, cloud computing will increase the company's flexibility. In addition, cloud computing provides significant benefits to users, such as lower upfront costs associated with traditional computing resources, lower staff salaries for managing the system and database, flexible scheduling of the use of computing resources and services, and anytime, anywhere access to the cloud (Kim, 2009)

2.1.3. Artificial Intelligence and Process Automation

Artificial intelligence (AI) is a field of study that characterizes robots' capacity for human-like learning, comprehension, and behavior recognition (Alsedrah, 2017). Artificial Intelligence (AI) is renowned for its astounding benefits, including cost-effectiveness, dependability, and the capacity to make decisions and handle complex challenges. Furthermore, it also guards against database data loss. Reinforcement learning, an analytical tool based on real-world success and failure testing to improve the readability of programs, is another feature of AI that sets it apart from other systems. Humans learn from their failures (Sadek & Chowdury, 2012). Artificial intelligence technologies are also very important in business because of their advanced reinforcement learning tools (Nadimpalli, 2017). By guiding and tracking each cargo's movements despite their locations and time zone differences, shipping businesses can utilize it to make sure they can move the cargo with which they are dealing effectively. Additionally, the banking and finance industries can utilize it to evaluate various concerns and ensure that their business is free from hostile and suspicious activity (Thiemann, 2018).

2.1.4. Computer Simulations

A computer program designed to investigate the approximate behavior of a mathematical model using step-by-step procedures is known as a computer simulation (Winsberg, 2013). Algorithmic models are used in computer simulation to determine the system's state at each instant. The process of conceptualizing a mathematical model requires this computation. Agent-based simulations, equation-based simulations, multiscale simulations, and Monte Carlo simulations are the four main categories of computer simulations.

Equation-based simulations are typically employed in the sciences, where the process of building mathematical models based on differential equations is guided by governing and absolute theories. The second is agent-based simulations, which are typically employed in the social, behavioral sciences, and other fields studying how a group of people interacts over a network. Multiscale simulations, which incorporate modeling components from several scales, are the third kind. A hybrid modeling approach will be produced by further dissecting the defined modeling pieces through the stimulation of lower-level descriptions (Winsberg, 2019). The last method is the Monte Carlo Simulations, which compute a mathematical model property by generating randomness using computer

techniques. In order to compute alternate attributes for the system, this simulation model mimics the deterministic system (Grune-Yanoff & Weirich, 2010).

2.1.5. Internet of Things (IoT)

The Internet of Things, or IoT, is a set of network technologies that use information-sensing devices to establish protocols to connect any tools or objects to the internet (Patel et al., 2016). When a business uses IoT technology, significant benefits are anticipated since it increases productivity and communication quality, automates processes and controls vast amounts of data to produce faster and more accurate results, and cuts down on expenses and task completion times. The Internet of Things is also expected to have macroenvironmental benefits, such as improving living standards through more comfortable daily living, creating new IoT-focused business opportunities that will drive economic growth and job creation, and reducing environmental effects through resource conservation (Soumyalatha & Hegde, 2016).

2.1.6. Online Technologies

According to Reid & Lorenz (2008), The global, publicly accessible networks of networks that are linked by networking technologies and allow users to exchange data, resources, and services are collectively referred to as the Internet. There are many different technologies on the internet, including webpages, which are essentially collections of pages and material designated by a domain name. It has been demonstrated that these internet technology components offer many benefits for both society and commercial enterprises. According to Berisha-Shaqiri et al. (2015), one way to look at internet technology strategically is as a tool that helps companies expand into new markets by distributing and promoting their products and services. Additionally, it increases commercial activity efficiency and gives the company a competitive edge.

2.2. *Financial Performance Indicators*

Measuring an organization's financial performance is one technique to find out how profitable it is financially over a given period. Another common method for determining a company's financial health is to look at its financial performance. According to multiple research (Eisenberg (1998); Eremina et al. (2019); Chen & Srinivasan (2019), profitability, sales growth, and stock return are three of the most popular metrics for an organization's financial aspect. Because the factors of all three of these financial characteristics are similar, they are somewhat entwined ways to measure how an organization performs financially in generating profit for a certain period by measuring its financial performance. Financial performance is also often used to check whether a firm is financially healthy. Three of the most common measures for the financial aspect of an organization to see from its profitability, sales growth, and stock return as used by several studies (Eisenberg et al., 1998); Eremina et al. (2019); Chen & Srinivasan (2019)). All these three financial aspects are partially intertwined due to the similarity of determinants.

2.2.1. Profitability

Since making a profit is a business's primary goal, profitability is the first aspect of financial performance (Nimalathasan, 2009). A company's stakeholders must understand how profitable the industry is doing. To achieve it, they can compute profitability ratios, which gauge a company's capacity to turn a profit and make strategic investments. Margin ratios and return ratios are the two primary formulas that make up the profitability ratios. Cash flows, operational profit margin, net profit margin, EBITDA margin, and gross profit margin are examples of margin ratios. Among the return ratios are return on assets (ROA), return on invested capital (ROIC), and return on equity (ROE). Any rise in these characteristics is considered to be associated with improved financial success. Furthermore, the results of additional research, which affirm that profitability is the primary determinant of financial performance, support the conclusions. (Amato & Wilder, 1990; Berger & Ofek, 1995; Bothwell et al., 1984; Dalton & Penn, 1976; Hall & Weiss, 1967; Shepherd, 1972).

2.2.2. Sales Growth

The increase in a company's net sales or revenue from one fiscal year to the next is known as sales growth. Since sales growth is closely related to a key sign of whether a business is expanding and is viewed as a success indicator for a business, it is frequently considered the strategic goal and objectives of a company (Gupta et al., 2013). Therefore, it is imperative that a business concentrate on growing its net sales over time.

Many factors influence an organization's increase in sales. According to some research, the company's size, age, and leverage are among the other financial factors that have a major impact on the company's sales growth (Eldomiaty, 2016; Dabla-Norris & Inchauste, 2007; Bahadir et al., 2009). The degree of sales growth of the company can also be determined by other factors, including marketing, innovation, inter-organizational network, entrepreneurial orientation, and even management capacity (Bahadir et al., 2009). Consequently, it can be deduced that numerous factors influence the company's ability to develop its sales, acting as the company's growth drivers

2.2.3. Stock Performance

Not to be overlooked, since equity value is a component of the larger firm value, stock return also plays a critical role in determining a company's financial performance, particularly with regard to its worth. Stock return is calculated by dividing the starting stock price by the appreciation of the stock price plus the dividends paid by the company. There are macroeconomic and firm-specific factors that affect stock return. According to Endri et al. (2019), ROA may have a favorable impact on stock performance when considering firm-specific factors. Firm-specific factors, including the earnings-to-price (EP), book-to-price (BP), dividend-to-price (DP), and sales-to-price (SP) ratios, may also have an impact on stock return, according to a well-known study by Bauer et al. (2004). As a result, these variables might be a part of the control variables in a stock return study. According to Azar (2014), a macroeconomic element, currency depreciation increases equity returns for US companies

Table 1: Systematic Literature Review

Author	Objectives	Methodology	Variable	Findings
(Eremina, Lace, & Bistrova, 2019)	Examine about the digital maturity and explain the correlation between the digital maturity and corporate performance of Baltic listed companies'	Qualitative method using text query	<ul style="list-style-type: none"> • General • Internet of things • Data science • Process automation • Artificial intelligence • Online 	<ul style="list-style-type: none"> • There is a positive trend related to the digital marketing of Baltic State. • Digital maturity gives a positive impacts on the company's sales growth and the Return of Equity (ROE). • Digital maturity enables a company to increase the profitability of its invested capital based on fact there is a positive correlation on ROE and gross profit over assets. • Since digital maturity is not yet fulfilled completely in companies' net earnings/dividends which impacts the total return, therefore digital maturity gives negative correlation to shareholders' return.
(da Costa <i>et al.</i> , 2022)	Using the Brazilian instance as a research model and a sample of more than 340 businesses, assess the digital maturity of MSEs.	Quantitative method using ANOVA	<ul style="list-style-type: none"> • Organizational dimensions (strategy; leadership; products; operations; culture; people; governance; and technology) • Digital evolution (unconscious; conceptual; defined; integrated; and transformed) 	<ul style="list-style-type: none"> • It was discovered that the process of digital transformation is quite interconnected and complex. • More than half of the sample still exhibits low digital maturity, mostly as a result of flaws in the governance, technology, and human elements. • Brazilian MSEs did not appear to be supportive of the digital transformation, largely necessitating process redesign and strategic planning by

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(Mettler, & Pinto, 2018)	To understand what really constitutes digital maturity in the context of hospitals, how can it be frugally assessed, and what may be discovered from a long-term viewpoint.	Quantitative method using path analysis	<ul style="list-style-type: none"> • Hardware and software • Operations and maintenance • Personnel development • Digital maturity • Usage intensity 	<p>businesses to build structural, systemic, cultural, and technological improvements towards digitization.</p> <ul style="list-style-type: none"> • Inferential analyses revealed that being innovative is a requirement for Brazilian MSEs' digitalization. • Digital maturity is a relative and subjective concept that, depending on the viewpoints of healthcare experts, either gets better or worse with time, and it seldom reaches a final state. • Investments in maintenance, operations, and employee development have a negative impact on digital maturity, those made in hardware and software tend to have a beneficial impact. • If digital maturity is properly managed, it offers a method to interact with many players and to talk about improvement initiatives that go beyond specific technology or projects.
(Xu, Yu, Zhang, & Zhang, 2023)	Examine the influence of digital transformation on eco-innovation and the influence of eco-innovation on sustainability performance	Quantitative method using PLS-SEM	<ul style="list-style-type: none"> • Digital capability • Digital strategy • Eco-process innovation • Eco-product innovation • Eco-management innovation • Sustainable performance 	<ul style="list-style-type: none"> • Eco-innovation which encompasses eco-process, eco-product, and eco-management innovation, can be promoted through digital transformation, which includes digital capability and digital strategy. • Innovation in eco-processes, eco-products, and eco-management can improve sustainability. • The relationship between digital transformation-sustainable and sustainable performance is partially mediated by eco-innovation.
(Zhu, Ge, & Wang, 2021)	Identify the key publications, map influential nations, organizations, and journals graphically, and identify the research themes that make up the intellectual framework of the field of digital transformation.	Systematic literature review	<ul style="list-style-type: none"> • Digital business strategy • Strategic action field • Digital technology • Agile digital transformation • Digital enterprise architecture • Digital transformation of manufacturing • Digital transformation of consulting service 	<ul style="list-style-type: none"> • Bibliometrics was applied to solve the issue of dealing with a lot of data. • By clustering the co-citation data, main route analysis was used to track the knowledge evolution of DT articles and identify the major themes of DT research.
(Bhandari, Z'amborský, Ranta, Salo, 2023)	Examine how the relationship between digitalization and business performance is influenced by the level of outward internationalization and inflows of Foreign Direct Investment (FDI) from the firm's home country.	Quantitative method using GMM	<ul style="list-style-type: none"> • Firm performance • Digitalization • Degree of outward internationalization • FDI 	<ul style="list-style-type: none"> • There is a curvilinear relationship between digitalization and business performance, with the slope at low levels of digitalization being negative or flat, and at progressively higher levels of digitalization being increasingly positive. • High-level FDI and DOI inflows boost the performance improvements linked to high-level digitalization.
(Aslanova, & Kulichkina, 2020)	Create an explanation of digital maturity that includes the fundamental	Quantitative method using descriptive analysis	<ul style="list-style-type: none"> • Strategy • Organization • People • Technologies 	<ul style="list-style-type: none"> • Several elements that can be used to explain digital maturity are strategy, organization, people, technologies, and data.

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	components as well as to create a framework for evaluating digital maturity.		<ul style="list-style-type: none"> Data 	<ul style="list-style-type: none"> In order to evaluating digital maturity, there are 3 scales that can be used to classify the organization – the digitalization strategy, the level of digitalization of the organization, and readiness for digitalization.
(Rossmann, 2018)	Examine what is the conceptual definition of the idea of digital maturity, what competencies are included in the idea of digital maturity, and how can businesses assess their digital maturity.	Quantitative method using exploratory factor analysis	<ul style="list-style-type: none"> Strategic Leadership Market Operational People and Expertise Cultural Governance Technology 	<ul style="list-style-type: none"> Digital maturity is a construct with 8 dimensions – strategy, leadership, business model, operating model, people, culture, governance, and technology – with 32 components.
(Salume, Barbosa, Pinto, & Sousa, 2021)	Determine the factors or characteristics that influence the growth of digital maturity.	Quantitative method using PLS-SEM	<ul style="list-style-type: none"> Strategy Leadership Market Operational, People Culture Governance Technology 	<ul style="list-style-type: none"> The dimensions that have the strongest connections to the growth of digital maturity are those of strategy, market, operations, culture, and technology.
(Çallı, & Çallı, 2021)	Disclose the impact of SMEs' digital maturity on their performance as well as look into the role of organizational agility as a moderator effect in this relationship.	Quantitative method using PLS-SEM	<ul style="list-style-type: none"> Organizational Agility Digital Maturity Firm Performance Organizational Agility 	<ul style="list-style-type: none"> Strong evidence for the beneficial effects of digital maturity on business performance was discovered. Organizational agility improvements lessen the effect of digital maturity on business performance.
(Salviotti, Gaur, & Pennarola, 2019)	Investigates the relationship between major strategic elements of digital transformation and digital maturity.	Quantitative method using Mann-Whitney test	<ul style="list-style-type: none"> Shared digital vision Shared transformation vision Internal communication of digital vision Perceived impact of digital technology in business and management Employee training Recruitment Digitalization Capabilities Market Capitalizing Agility Operational Adjustment Agility Firm Performance 	<ul style="list-style-type: none"> Digital maturity is higher when top management has a shared digital vision, the goal is effectively communicated within the organization, and staff are required to receive training in digital capabilities.
(Li, Tong, Wei, & Yang, 2022)	Analyze the mechanism by which digitalization capabilities have an impact on company performance, and determine whether market capitalizing agility and operational adjustment agility serve as a mediator in this relationship.	Quantitative method using confirmatory factor analysis	<ul style="list-style-type: none"> Autonomous Choice to Use Mobile Devices Autonomy Within Digital Contexts Digital Literacy Individual Growth in Digital Contexts Digital Risk Awareness Support-seeking Regarding Digital Problems Regulation of Negative Emotions in Digital Contexts 	<ul style="list-style-type: none"> Agileness completely mediates the association between digitalization capabilities and company performance in the context of the COVID-19 epidemic, in addition to the direct relationship between agility, digitalization capabilities, and firm performance.
(Laaber, Florack, Koch, & Hubert, 2023)	Present a comprehensive idea and assessment of young people's digital maturity that combines objectives for healthy individual growth and objectives for online socialization.	Quantitative method using confirmatory factor analysis	<ul style="list-style-type: none"> Autonomous Choice to Use Mobile Devices Autonomy Within Digital Contexts Digital Literacy Individual Growth in Digital Contexts Digital Risk Awareness Support-seeking Regarding Digital Problems Regulation of Negative Emotions in Digital Contexts 	<ul style="list-style-type: none"> Presented and studied the idea of “digital maturity” as a fresh perspective on how young people use digital technologies. Personality qualities that reflect personality maturity, such as conscientiousness, agreeableness, and negative emotionality are associated with digital maturity.

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(Borštnar, & Pucihar, 2021)	Offer a design for a multi-attribute model based on the design science approach for evaluating digital maturity.	Quantitative method using multi-attribute decision making	<ul style="list-style-type: none"> Regulation of Impulses in Digital Contexts Respect Towards Others in Digital Contexts Digital Citizenship Digital capability (use of technology, the role of informatics, digital business model, and strategy) Organizational capability (human resources, organizational culture, and management) 	<ul style="list-style-type: none"> Utilizing a design science research approach and the DEX technique, create a complete multi-attribute model that can be used to evaluate the various levels of digital maturity of a SME.
(Duarte, Pereira, & Carneiro, 2022)	Identify the importance factors to measure DM, describe the analysis procedure to measure DM on manufacturing enterprises in the region of Tâmega e Sousa, and obtain some results based on a pilot test survey regarding the DM level of firms in this region	Quantitative method using descriptive analysis	<ul style="list-style-type: none"> Strategy (strategy and business model) Technology HR Processes (organizational culture, employees, leadership, governance) Production Processes (operations/logistics; production & processes) Marketing Processes (customer, marketing) Products. 	<ul style="list-style-type: none"> Three elements to measure digital maturity: Products, Processes, and Strategy. Tool implementation flow chart can be used to measure digital maturity in manufacturing enterprises, While some businesses are driving their own digital transformation, others are aware of the reality.
(Perera, et al., 2022)	To create a strategic framework for evaluating the digital maturity of architecture and design in the Australian context.	Systematic literature review	<ul style="list-style-type: none"> Basic digitalisation Advanced digitalisation Smart digitalisation Transformative digitalisation 	<ul style="list-style-type: none"> This study presented a strategic framework for the digitalization of design and construction (SFDDC) to direct architects, engineers, and contractors in making sustained improvement.
(Pinto, Salume, Barbosa, & de Sousa, 2022)	Identifies characteristics of retail organizations' digital maturity and groups them into categories to provide a path toward it. A multidimensional concept for digital maturity is employed to do this for a number reasons.	Quantitative method using cluster analysis	<ul style="list-style-type: none"> Strategy Market Operations Culture Technology Digital maturity 	<ul style="list-style-type: none"> Companies must be clustered along five dimensions: strategy, market, operations, culture, and technology. To attain digital maturity, a company must build capabilities connected to five dimensions. A guide for retail businesses to digital maturity.
(Afkar, Syamsi, Tamara, & Furinto, 2020)	To asses the changes in the digital maturities of Indonesia's industries before and during the COVID-19 outbreak and to identify which industries are leading and which are trailing.	Quantitative method using descriptive analysis	<ul style="list-style-type: none"> Strategy Transformation Management Organisation Culture and Expertise Cooperation Process Digitisation Information Technology Product Innovation Customer Experience 	<ul style="list-style-type: none"> Before and throughout the epidemic, the property, real estate, and construction industries were the most prevalent. Prior to the pandemic, Basic Industry and the Chemicals Industry were the laggard sectors. During the pandemic, the Agriculture Sector was left behind. During the pandemic, Indonesia's average digital maturity score grew across all industries.
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Author	Objectives	Methodology	Variable	Findings
(Pinto, Salume, Barbosa, & de Sousa, 2023)	Identifies characteristics of retail organizations' digital maturity and groups them into categories to provide a path toward it. A multidimensional concept for digital maturity is employed to do this for a number reasons.	Quantitative method using cluster analysis	<ul style="list-style-type: none"> • Strategy • Market • Operations • Culture • Technology • Digital maturity 	<ul style="list-style-type: none"> • Companies must be clustered along five dimensions: strategy, market, operations, culture, and technology. • To attain digital maturity, a company must build capabilities connected to five dimensions. • A guide for retail businesses to digital maturity.
(Afkar, Syamsi, Tamara, & Furinto, 2020)	To assess the changes in the digital maturities of Indonesia's industries before and during the COVID-19 outbreak and to identify which industries are leading and which are trailing.	Quantitative method using descriptive analysis	<ul style="list-style-type: none"> • Strategy • Transformation Management • Organisation • Culture and Expertise • Cooperation • Process Digitisation • Information Technology • Product Innovation • Customer Experience 	<ul style="list-style-type: none"> • Before and throughout the epidemic, the property, real estate, and construction industries were the most prevalent. • Prior to the pandemic, Basic Industry and the Chemicals Industry were the laggard sectors. • During the pandemic, the Agriculture Sector was left behind. • During the pandemic, Indonesia's average digital maturity score grew across all industries.

4. Method

4.1. Literature Synthesis Analysis

A systematic literature review's primary objective is to gather and assess the body of research being done on a given subject, resulting in unbiased conclusions that can be independently confirmed and repeated (Lame, 2019). A systematic literature review is a thorough, methodological evaluation of research findings that aims to both group related works and support the development of evidence-based recommendations for study specialists. Eighteen papers collected from electronic sources are included in this investigation.

5. Results and Discussion

The association between the variables under inquiry is displayed in the literature review. The results show that cloud computing, artificial intelligence, process automation, big data analytics, internet of things (IoT), computer simulations, and online technology all have an impact on financial performance. The proposed framework is presented below to show how each variable is expected to relate to the others.

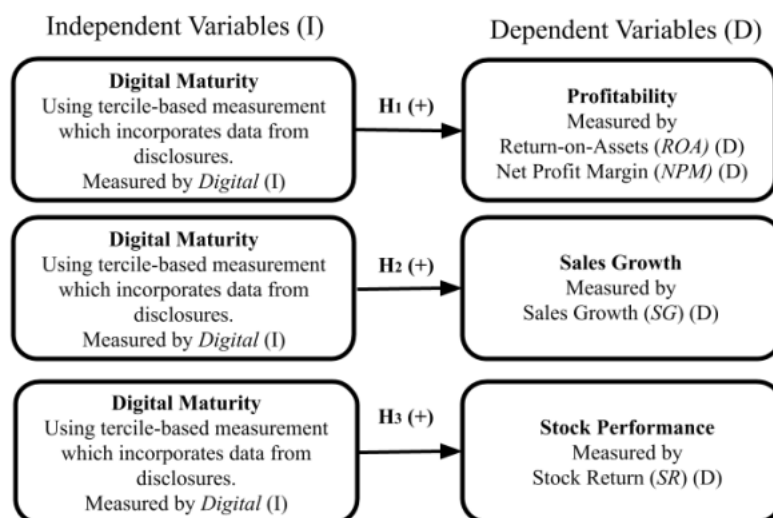


Figure 1: Theoretical Framework

Source: Author

6. Conclusion

This study has conducted an effective review of the literature on the relationship between digital maturity and financial success. The following elements were shown to have an effect on financial performance: online technologies, cloud computing, artificial intelligence, process automation, big data analytics, computer simulations, and the internet of things (IoT). Additional research on the variables influencing financial performance based on digital maturity level can be built upon this study. Furthermore, by utilising digital aspects generally, this research offers perspectives for organisations looking to enhance their financial performance and contributes to the body of literature on digital maturity

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Analysis of Optimal Portofolio Formation Using Markowitz Model and Portofolio Performance Evaluation

Andisyah Purdanto¹

¹ School of Economics and Business, Telkom University, Bandung, Indonesia

Correspondence: Andisyah Purdanto, Jl.Pinang Blok D21 No.2 Griya Prima Asri Tahap IV, Bandung, 40375, Indonesia. E-mail: andisyah.purdanto@gmail.com

Abstract

The year 2020 was a challenging year for investment worldwide, especially for the stock market. This was due to the World Health Organization (WHO) declaring Covid-19 a pandemic. This resulted in the composite stock price index (IHSG) dropping from 6300 to 3900. High volatility occurred from March 2020 until the end of 2022, and traders took advantage of this by engaging in high-risk short selling. The purpose of this research is to analyze the formation of a Markowitz portfolio and evaluate the performance of portfolios formed from the IDX30 index and the BSE Sensex index, focusing on the period from one month before the rebound, which is from August 2020 to January 2023. This analysis aims to provide guidance in selecting companies for investment. The research methodology is descriptive research. The methodology used is Markowitz modeling to obtain an optimal portfolio, followed by evaluation using the Treynor, Sharpe, and Jensen indexes. The results, for the IDX30 index, an optimal portfolio comprising six stocks achieved an expected annual return of 19.97% with a risk level of 8.77%. In contrast, the optimal portfolio for the BSE Sensex index consisted of eight stocks, yielding an expected annual return of 28.4% with a risk level of 4%. Regarding performance, the portfolio formed from the BSE Sensex index outperformed the IDX30 portfolio when assessed using the Sharpe indices. However, considering the Jensen and Treynor index, the optimal portfolio formed from the IDX30 index exhibited superior performance.

Keywords: Markowitz Portfolio, Optimum Portfolio, Portfolio Performance, Sharpe Indice, Treynor Indice, Jensen Indice

1. Introduction

In 2020, the world faced significant challenges due to the Covid-19 pandemic, which was officially declared by the World Health Organization (WHO) on March 9, 2020. Various countries implemented policies to prevent the spread of the virus, including lockdowns, physical distancing measures, and travel restrictions.

Muhammad Adisurya (2020) highlighted that the Covid-19 pandemic triggered a crisis worldwide, affecting various sectors, including finance. Indonesia's Financial Services Authority (OJK) reported a severe blow to the composite stock price index, with a significant decline in stock prices. At the beginning of 2020, stock prices hovered around 6300 but dropped to 3900 by March 2020. Additionally, trading volume also decreased from 36.5 billion in 2019 to 27.4 billion in 2020. Factors influencing the capital market during the Covid-19 pandemic included speculation related to government stimulus measures and responses from central banks.

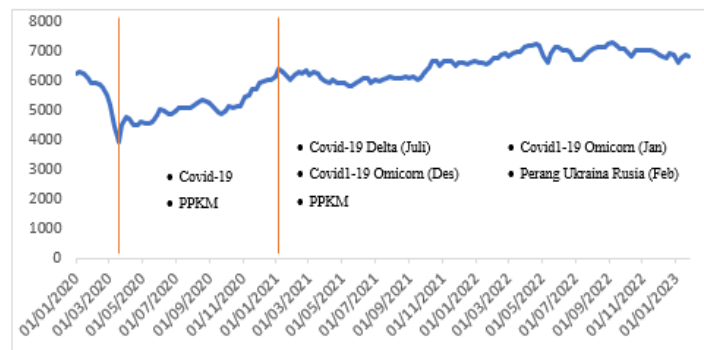


Figure 1: IDX30 Indices

Figure 1 illustrates the pattern of the Indonesian Composite Stock Price Index (IHSG) from March 2020 to January 2023. Based on the graph, IHSG experienced a decline in March 2020. According to Putranto (2021), there is a significant difference between IHSG in December 2019 and March 2020, where stock prices before Covid-19 were higher compared to after the pandemic hit. Even in June 2020, three months later, the price movement had not significantly recovered. The trend of IHSG prices during the Community Activities Restriction Enforcement (CARE) period (June 2020 to July 2021) was better compared to the early Covid-19 period.

According to Haryati (2021), Indonesia was hit by cases of the Covid-19 Delta variant, with the peak occurring in July 2021 and declining in October 2021. However, this condition did not significantly affect the overall capital market. This can be observed from a study conducted by Soputan (2022), which found no significant difference in abnormal returns and trading volume activity before and after the announcement of the Delta variant. By the end of 2021, the Indonesian Composite Stock Price Index (IHSG) demonstrated positive performance, reaching 6581 or a 10.1% year-on-year increase (Binikasri, 2022). Abnormal return refers to the difference between expected profit levels and actual measurement levels (Jogiyanto, 2016).

In December 2021, the first cases of the Covid-19 Omicron variant were detected in Indonesia, suspected to have entered the country through Indonesian citizens originating from Nigeria (source: www.kemkes.go.id). Subsequently, the BA.4 and BA.5 variants entered Indonesia in mid-2022, with cases detected in Bali (source: www.kompas.com).

However, the majority of Omicron cases in 2022 did not significantly impact abnormal returns in the stock market. This was revealed by Arlitha (2022) and Putra (2023), whose research indicated no significant changes in abnormal returns and average volume activity for the LQ45 Index and IDX30 Index.

In 2022, several events also influenced the performance of the Indonesian Composite Stock Price Index (IHSG), including the Ukraine-Russia conflict and the Federal Reserve's interest rate hikes, leading to fluctuating movements in the IHSG. Nevertheless, based on data as of December 30, 2022, the IHSG stood at 6868, representing a 4.35% year-to-date increase. Additionally, in 2022, the IHSG ranked first in Asia, surpassing Singapore's STI index (source: www.idxchannel.com).

The Nikkei 225 (Japan), HSI (Hong Kong), and STI (Singapore) indices in Figure 1.5 exhibit a pattern similar to the JKSE/IHSG (Indonesia). There was a decline in March 2020, followed by an upward trend until early 2023. However, it is noticeable that the Hang Seng index experienced a decline in the fourth quarter of 2022 and then rebounded at the beginning of 2023.

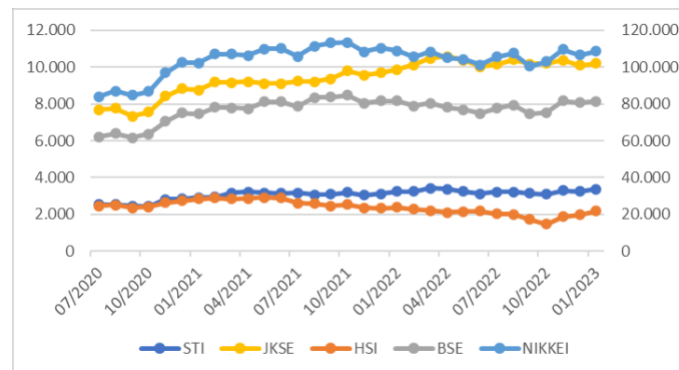


Figure 2: Asia Pasific Indices

Several Asia Pacific indices, represented by the BSE Sensex 30 (India), Nikkei 225 (Japan), HSI (Hong Kong), and STI (Singapore) as shown in Figure 1.5, exhibit a pattern similar to the JKSE / IHSG (Indonesia) with a decline in March 2020 followed by an increase until early 2023. However, the Hang Seng index shows a decline in the fourth quarter of 2022 and then rises again at the beginning of 2023.

The average monthly returns for the Asia Pacific indices are presented in Table 1. Based on the table, the majority of indices have positive average returns, and the BSE has a larger average return compared to the JKSE.

Table 1: Average Return of Asia Pacific Indices

<i>Index</i>	<i>Average Return</i>
JKSE	1,14%
BSE Sensex	1,83%
NIKKEI	0,07%
HSI	-0,09%
STI	0,93%

Table 1 illustrates the average returns of several Asia Pacific indices. According to the table, only the BSE Sensex index has a higher average return compared to the JKSE (IHSG). The performance of stocks post-pandemic has influenced investment conditions and opportunities (Febrianto, 2023). According to Eduardus Tandelilin (2017), an investor buys a number of shares with the expectation of gaining profits from the increase in stock prices or dividends in the future, as a reward for the time and risk associated with the investment. The basis of investment decisions consists of the expected return rate, the level of risk, and the relationship between return and risk.

According to Oktaviani (2022), investors need to assess portfolio performance to analyze and determine whether the formed portfolio can increase the likelihood of achieving investment goals and to identify which portfolios perform better. Performance evaluation begins with calculating the return of the portfolio. One method to calculate portfolio return is by summing all received cash flows (dividends plus changes in base value). However, this simple method has a drawback as it only calculates a "static" return rate (Tandelilin, 2017). There are three indices that can be used in measuring portfolio performance: the Sharpe index, Treynor index, and Jensen index. When measuring portfolio performance, it can be assumed that there is a linear relationship with the market index. These three methods perform analysis based on historical returns and predict future returns and risks (Samsul, 2015).

Previous studies have captured the phenomenon of stock declines and rises due to several events from 2020 to the end of 2023. Research conducted by Puspitasari (2023) titled "Comparative Analysis of Optimal Portfolio

Performance Using the Sharpe, Treynor, and Jensen Methods Before and During the Covid-19 Pandemic" was carried out on the IDX30 index from 2018 to 2021. This study shows differences in portfolios formed before and during the pandemic, as some companies were unable to maintain their performance.

Research conducted by Sandhi et al. (2017), titled "Comparative Study of SME Stock Portfolio Performance in the Capital Markets of Indonesia, China, and India," aims to compare the performance of SME stock portfolios in the capital markets of Indonesia, China, and India based on the Sharpe index and the significance of the average performance differences among these capital markets. The results of this study indicate that the SME stock portfolios in the capital markets of Indonesia, China, and India outperform A-list stocks. However, for composite stocks, only Indian SME stocks have performance below the composite stocks.

Based on the aforementioned background, this study aims to provide insights to investors in determining investment strategies when systematic risks occur in the stock market. The IDX30 index is used due to its high liquidity and large market capitalization, while the BSE Sensex index is selected for its higher average return compared to the IHSG index. Historical data from August 2020 to January 2023 is utilized, encompassing events such as the Covid-19 pandemic, the Ukraine-Russia war, and post-Covid-19 economic recovery in Indonesia.

2. Research Method

This study employs a descriptive method. According to Sugiyono (2013), the descriptive method is the formulation of a problem related to the statement of independent variables, whether only one or several variables, without comparing one variable with another. A depiction of the occurring phenomenon is required so that the collected and analyzed data are relevant, thus obtaining a profile of events, people, and situations (Saunders et al., 2016).

The research paradigm used is positivism. Positivism relates to the philosophical stance of the researcher and operates based on observed reality without being influenced by interpretation. Positivist researchers tend to use structured methodologies (Saunders et al., 2016).

The approach to theory development in this study is deductive. Deductive reasoning is a research technique that starts from a theory, which is then developed and a strategy is designed that can be generally applied. Some characteristics of deductive reasoning include first, seeking causal relationships between concepts and variables; then, quantitative data collection; and finally, generalization, which involves careful sampling techniques so that the measurements can be generally applied to the objects (Saunders et al., 2016).

The research methodology used is quantitative. Quantitative research is the process of discovering knowledge using numerical data. This method explains the problem-solving process of a research object based on data that is then interpreted (Darmawan, 2013).

The variables used in this study are the stock returns in the IDX30 and BSE Sensex indices, which are calculated from the stock closing data. The return data are then processed to obtain an optimal portfolio using the Markowitz method.

According to Sugiyono (2013), a population is a generalization area consisting of objects/subjects that have certain qualities and characteristics to be studied and drawn conclusions from. In this study, the population includes the Asia Pacific indices such as JKSE (Indonesia), BSE Sensex (India), Nikkei 225 (Japan), HSI (Hong Kong), and STI (Singapore), as well as the listed companies on the Indonesia Stock Exchange (IDX) and the listed companies on the BSE Sensex.

2.1 Sample

The definition of a sample is a part of the quantity and characteristics possessed by a population (Sugiyono, 2013). The sample taken in this study consists of the companies included in the IDX30 index of the Indonesia Stock

Exchange (IDX) according to IDX Announcement No. Peng-00018/BEI.POP/01-2023 and the companies in the BSE Sensex for the year 2023 according to www.spglobal.com.

Sampling technique refers to the method used to select a sample in research (Sugiyono, 2013). One sampling technique is purposive sampling. Purposive sampling is a technique classified under non-probability sampling, where the sample is determined based on certain considerations (Sugiyanto, 2023).

Table 2: Sample Selection Criteria

Index	Criteria	Amount
IDX30	Numbers of issuers	30
BSE Sensex	Numbers of issuers	30
	Total sample	60

Based on Table 2, the number of samples that meet the criteria in this study includes 30 companies for the IDX30 index and 30 companies for the BSE Sensex index.

Table 3: Sample from IDX30 Indices

No	Code	Company	No	Code	Company
1	ADRO	Adaro Energi	16	HRUM	Harum Energi
2	AMRT	Sumber Alfaria Trijaya	17	INCO	Vale Indonesia
3	ANTM	Aneka Tambang	18	INDF	Indofood Sukses Makmur
4	ARTO	Bank Jago	19	ITMG	Indo Tambangraya Megah
5	ASII	Astra Internasional	20	KLBF	Kalbe Farma
6	BBCA	Bank Central Asia	21	MDKA	Merdeka Copper Gold
7	BBNI	Bank Negara Indonesia	22	MEDC	Medco Energi Internasional
8	BBRI	Bank Rakyat Indonesia	23	PGAS	Perusahaan Gas Negara
9	BMRI	Bank Mandiri	24	PTBA	Bukit Asam
10	BRPT	Barito Pacific	25	SMGR	Semen Indonesia
11	BUKA	Bukalapak.com	26	TBIG	Tower Bersama Infrastruktur
12	CPIN	Charoen Pokphand Indonesia	27	TLKM	Telkom Indonesia
13	EMTK	Elang Mahkota Teknologi	28	TOWR	Sarana Menara Nusantara
14	ESSA	Surya Esa Perkasa	29	UNTR	United Tractor
15	GOTO	GoTo Gojek Tokopedia	30	UNVR	Unilever Indonesia

Table 4: Sampel from BSE Sensex Indices

No	Code	Company	No	Code	Company
1	ASPN	Asian Paints Ltd	16	LART	Larsen & Toubro Ltd
2	AXBX	Axis Bank Ltd	17	MAHM	Mahindra & Mahindra Ltd
3	BJFN	Bajaj Finance Ltd	18	MRTI	Maruti Suzuki India Ltd
4	BJFS	Bajaj Finserv Ltd	19	NEST	Nestle India Ltd
5	BRTI	Bharti Airtel Ltd	20	NTPC	NTPC Ltd
6	REDY	Dr. Reddy/s Laboratories Ltd	21	PGRD	Power Grid Corp of India
7	HCLT	HCL Technologies Ltd	22	RELI	Reliance Industries Ltd
8	HDBK	HDFC Bank Ltd	23	SBI	State Bank of India Ltd
9	HLL	Hindustan Unilever Ltd	24	SUN	Sun Pharmaceutical Ltd
10	HDFC	Housing Dev Finance Ltd	25	TCS	Tata Consultancy Servi Ltd
11	ICBK	ICICI Bank Ltd	26	TISC	Tata Steel Ltd
12	INBK	Indusind Bank Ltd	27	TEML	Tech Mahindra Ltd
13	INFY	Infosys Ltd	28	TITN	Titan Company Ltd
14	ITC	ITC Ltd	29	ULTC	Ultratech Cement Ltd
15	KTKM	Kotak Mahindra Bank Ltd	30	WIPR	Winpro Ltd

2.2 Data Analysis

The steps in conducting data analysis in this study are as follows:

1. Collecting monthly closing price data for each stock for the period from August 1, 2020 to January 31, 2023.
2. Calculating the return (R_{it}) for each stock within the specified period.

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad (1)$$

R_{it} = Stock Return

P_{t-1} = Stock Price at start

P_t = Stock Price at end

3. After obtaining the returns for all stocks, calculate the average value of the returns. This average value is referred to as the average return or expected return (E(R_i)).

$$E(R_i) = \frac{\sum_{t=1}^n R_{it}}{n} \quad (2)$$

E (R_i)= Expected Return

R_{it} = Return in Month t

n = Number of Calculated Month

"To obtain an optimal portfolio, stocks that do not have average returns below the market will not be included in the portfolio selection process."

4. After obtaining the expected returns, the next step is to calculate the variance of the returns for each stock.

$$\sigma_i^2 = \frac{1}{n} \sum (R_{it} - E(R_i))^2 \quad (3)$$

σ_i = Stock Varians

E (R_i) = Expected Return

R_{it} = Return in Month t

n = Number of Calculated Month

5. Calculate the standard deviation of each stock. This step is performed by taking the square root of the variance of each stock (σ_i).

$$\sigma_i = \sqrt{\sigma_i^2} \quad (4)$$

6. The next step is to calculate the covariance between each pair of stocks.

$$\sigma_{12} = \sum_{i=1}^n \frac{[(R_{1i} - E(R_1)) \cdot (R_{2i} - E(R_2))]}{n} \quad (5)$$

7. After obtaining the covariance, portfolio formation is carried out using the Solver program from Microsoft Excel.

8. After forming the portfolio, the calculation of realized return is performed.

$$R_p = \sum_{i=1}^n (w_i \times R_i) \quad (6)$$

R_p = Portfolio Return

w_i = Weight Assigned to Each Asset

R_i = Return of Individual Asset

n = Total Number of Assets in the Portofolio

9. Calculate expected return using equation

$$E(R_p) = \sum_{i=1}^n (w_i \times E(R_i)) \quad (7)$$

E(R_p) = Expected Return of the Portofolio

w_i = Weight Assigned to Each Asset

E(R_i) = Expected Return to Each Individual Asset

n = Total Number of Assets in the Portofolio

10. Calculate the standard deviation of the portfolio.

$$\sigma_p = \sum_{i=1}^n W_i \times \sigma_i^2 + 2 \times \sum_{i=1}^n \sum_{j=1}^n W_i W_j \sigma_{ij} \quad (8)$$

σ_p = Portofolio Standar Deviation

W_i = Weight of Aset Return

n = Total Number of Assets in the Portofolio

11. Calculate the portfolio beta. Before calculating the portfolio beta, calculate the individual stock beta.

$$\beta_i = \frac{\sigma_{i,M}}{\sigma_M^2} \quad (9)$$

β_i = Beta Coefficient for Asset

$\sigma_{i,M}$ = Covariance Between the Return of Asset

$\sigma^2_{,M}$ = Market Variance

12. Calculate Risk Free Rate (Rf). Risk-free Rate is calculated using the BI-7 Day Reverse Repo Rate (BI7DRR) and the 364-Day Treasury Bill Yield as benchmarks for the risk-free rate in the financial markets of Indonesia and India.

$$R_f = \frac{R_t - R_{t-1}}{R_{t-1}} \quad (10)$$

R_f = Risk free rate

R_{t-1} = Risk free at start

R_t = Risk free at end

13. The next step is to calculate the portfolio performance using the Sharpe, Treynor, and Jensen indices. The equations used to calculate portfolio performance are as follows.

$$\widehat{S}_p = \frac{\bar{R}_p - \overline{RF}}{\sigma_{TR}} \quad (11)$$

S_p = Sharpe Ratio

R_p = Expected Return of Portofolio

RF = Risk Free Rate

σ_{TR} = Standard Deviation of Portofolio

$$\widehat{T}_p = \frac{\bar{R}_p - \overline{RF}}{\beta_p} \quad (12)$$

T_p = Treynor Ratio

R_p = Expected Return of Portofolio

RF = Risk Free Rate

β_p = Beta Portofolio p

$$\widehat{J}_p = \bar{R}_p - (\overline{RF} + (R_M - \overline{RF})\hat{\beta}_p) \quad (13)$$

J_p = Jensen Ratio

R_p = Expected Return of Portofolio

RF = Risk Free Rate

β_p = Beta Portofolio p

3. Results & Discussion

The data for each constituent stock of both the IDX30 and BSE Sensex indices were obtained from www.investing.com and www.finance.yahoo.com for the period from August 1, 2020, to January 31, 2023. The analysis includes 30 constituents from the IDX30 index and 30 constituents from the BSE Sensex index.

Table 5: Example of IDX30 Average Monthly Price

Date	AMRT	ANTM	ARTO	ASII	BBCA
01/07/2020	740	730	2.322	5.150	6.240
01/08/2020	715	820	2.181	5.100	6.275
01/09/2020	665	705	2.355	4.460	5.420
01/10/2020	680	1055	2.364	5.425	5.790
.....
.....

01/10/2022	2.820	1845	5.100	6.650	8.800
01/11/2022	3.090	1985	4.590	6.050	9.300
01/12/2022	2.650	1985	3.720	5.700	8.550
01/01/2023	2.830	2310	3.210	6.000	8.475

Table 5 illustrates the average monthly prices of each stock from August 2020 to January 2023. This data collection was conducted for the IDX30 and BSE Sensex stock indices.

The risk-free rate data will be used in performance calculations. For portfolios formed on the IDX30 index, the BI-7 Day Reverse Repo Rate (BI7DRR) sourced from www.bi.go.id will be used, while for portfolios formed on the BSE Sensex index, the 364-Day Treasury Bill (primary) Yield sourced from www.rbi.org.in will be utilized.

Table 5: BI-7 Day Reverse Repo Rate

Month	BI-7 Day Reverse Repo Rate	Month	BI-7 Day Reverse Repo Rate	Month	BI-7 Day Reverse Repo Rate
Aug-20	4.00%	Jun-21	3.50%	Apr-22	3.50%
Sep-20	4.00%	Jul-21	3.50%	May-22	3.50%
Oct-20	4.00%	Aug-21	3.50%	Jun-22	3.50%
Nov-20	3.75%	Sep-21	3.50%	Jul-22	3.50%
Dec-20	3.75%	Oct-21	3.50%	Aug-22	3.75%
Jan-21	3.75%	Nov-21	3.50%	Sep-22	4.25%
Feb-21	3.50%	Dec-21	3.50%	Oct-22	4.75%
Mar-21	3.50%	Jan-22	3.50%	Nov-22	5.25%
Apr-21	3.50%	Feb-22	3.50%	Dec-22	5.50%
May-21	3.50%	Mar-22	3.50%	Jan-23	5.75%
Average risk free rate					3.85%

Table 6: 364-Day Treasury Bill Yield

Month	364-Day Treasury Bill (Primary) Yield	Month	364-Day Treasury Bill (Primary) Yield	Month	364-Day Treasury Bill (Primary) Yield
Aug-20	3.54%	Jun-21	3.85%	Apr-22	3.75%
Sep-20	3.63%	Jul-21	3.77%	May-22	5.92%
Oct-20	3.48%	Aug-21	3.66%	Jun-22	6.28%
Nov-20	3.45%	Sep-21	3.58%	Jul-22	6.24%
Dec-20	3.45%	Oct-21	3.95%	Aug-22	6.20%
Jan-21	3.63%	Nov-21	4.10%	Sep-22	6.66%
Feb-21	3.71%	Dec-21	4.26%	Oct-22	6.94%
Mar-21	3.84%	Jan-22	4.47%	Nov-22	6.86%
Apr-21	3.75%	Feb-22	4.49%	Dec-22	6.90%
May-21	3.73%	Mar-22	4.65%	Jan-23	6.91%
Risk Free Rate Average					4.62%

Source: www.rbi.org.in (2024)

From Table 5 and Table 6, it can be observed that the BI-7 Day Reverse Repo Rate taken from August 2020 to January 2023 has an average of 3.85%, whereas the 364-Day Treasury Bill (Primary) Yield has an average risk-free rate of 4.62%.

The next step involves calculating the return, expected return, variance, standard deviation, covariance, and portfolio formation. Once the portfolio is formed, the calculation of beta and risk-free rate follows as components of the Sharpe, Treynor, and Jensen index performance calculations.

Returns and expected returns are calculated for the IDX30 and BSE Sensex indices. For example calculation, using PT Aneka Tambang Tbk with the stock code ANTM. In August 2020, the average monthly price of ANTM was Rp. 730, while in September 2020, it was Rp. 830. The calculation of return for ANTM in September is derived as follows:

$$R_{it} = \frac{830-730}{730} = 0.1232$$

Therefore, the realized return, or also known as the actual return, of ANTM in September 2020 is 0.1232 or 12.32%. For calculating the Expected Return, we use the average monthly price data of ANTM from August 2020 to January 2023.

$$E(R_i) = \frac{(0.1232)+(-0.1402)+\dots+(0.1637)}{31} = 0.549$$

Therefore, the expected return obtained for ANTM stock during the observation period from August 2020 to January 2023 is 0.549 or 5.49%. Microsoft Excel was used in this research to facilitate the calculation of expected return using the AVERAGE function.

The calculations for return and expected return are conducted for all constituents of the IDX30 and BSE Sensex indices. In addition to individual stocks, average return calculations are performed for IHSG and BSE Sensex. The results of the average return calculations for both indices show an average return of 1.83% for IHSG and 1.01%.

Portfolio formation begins by selecting stocks based on their average return compared to their respective index. If a stock has an average return below that of its index, it will be eliminated. Out of the 30 constituents in the IDX30 index, 20 stocks have an average return higher than IHSG. Similarly, in the case of BSE Sensex, out of the 30 constituents, 20 stocks have an average return higher than the index.

Table 7: Issuer With Average Return Higher than IHSG

No.	Code	Return	No.	Code	Return
1.	ADRO	4.18%	11.	INCO	3.38%
2.	AMRT	5.13%	12.	KLBF	1.03%
3.	ANTM	5.49%	13.	HRUM	9.38%
4.	ARTO	3.00%	14.	ITMG	6.15%
5.	BBCA	1.19%	15.	MDKA	4.16%
6.	BBNI	2.80%	16.	MEDC	5.60%
7.	BBRI	1.62%	17.	PGAS	1.50%
8.	BMRI	2.07%	18.	PTBA	2.26%
9.	EMTK	5.02%	19.	TLKM	1.03%
10.	ESSA	8.61%	20.	TBIG	2.21%

Table 8: Issuer With Average Return Higher than BSE Sensex

No.	Code	Return	No.	Code	Return
1.	ASPN	1.95%	11.	ICBK	3.13%
2.	AXBK	2.89%	12.	INBK	3.55%
3.	BJFN	3.05%	13.	INFY	2.75%
4.	BJFS	3.61%	14.	ITC	2.13%
5.	HCLT	2.73%	15.	SUN	2.76%
6.	LART	2.92%	16.	TISC	5.14%
7.	MAHM	3.52%	17.	TEML	2.68%
8.	NTPC	2.22%	18.	TITN	3.35%
9.	PGRD	1.84%	19.	ULTC	2.19%
10.	SBI	4.26%	20.	WIPR	2.38%

Based on the table above. for the IDX30 index. it can be observed that out of the total 20 selected constituents. the average return ranges from 1.03% to 9.38%. Similarly. for the BSE Sensex index. which also consists of 20 constituents. the average return ranges from 1.84% to 5.14%.

The next steps involve calculating returns and average returns. followed by computing variance and covariance. As an example. stocks ANTM and ARTO used for variance and covariance calculation.

$$\sigma_i^2 = \frac{((0.1232-0.0549)+(-0.1402-0.0549)+\dots+(0.1637-0.0549))}{31} = 0.0378$$

$$\sigma_{12} = \sum_{i=1}^n \frac{[(0.1232-0.0549).(-0.0097-0.03)+\dots+(0.1637-0.0549).(-0.137-0.03)]}{31} = 0.016$$

If we look at the result. the covariance value between ANTM and ARTO is 0.016. which is positive. This indicates a positive covariance. meaning these two stocks move in the same direction; when one stock increases. the other tends to increase as well.

The calculation of variance and covariance is performed for 20 selected stocks from both the IDX30 and BSE Sensex indices. To facilitate these calculations. this research utilizes Microsoft Excel with the functions VAR.P for variance and COVAR.P for covariance. The table below shows the variance and covariance for IDX30 and BSE Sensex.

Table 9: Variance and Covariance of IDX30

Code	ADRO	AMRT	ANTM	ARTO	BBCA	BBNI	BBRI	BMRI	EMTK	ESSA
ADRO	0.017	0.002	-0.001	-0.004	0.002	0.003	0.002	0.001	0.001	0.009
AMRT	0.002	0.018	-0.005	0.002	-0.001	0.001	0.000	0.001	-0.001	0.001
ANTM	-0.001	-0.005	0.037	0.016	0.005	0.005	0.006	0.003	0.023	0.007
ARTO	-0.004	0.002	0.016	0.044	-0.001	-0.004	0.000	-0.004	0.026	0.008
BBCA	0.002	-0.001	0.005	-0.001	0.003	0.004	0.003	0.003	0.000	0.000
BBNI	0.003	0.001	0.005	-0.004	0.004	0.010	0.006	0.005	-0.001	0.003
BBRI	0.002	0.000	0.006	0.000	0.003	0.006	0.006	0.003	0.001	0.001
BMRI	0.001	0.001	0.003	-0.004	0.003	0.005	0.003	0.005	0.000	0.002
EMTK	0.001	-0.001	0.023	0.026	0.000	-0.001	0.001	0.000	0.044	0.018
ESSA	0.009	0.001	0.007	0.008	0.000	0.003	0.001	0.002	0.018	0.055
INCO	0.002	-0.001	0.014	0.002	0.002	0.005	0.005	0.002	0.006	0.006
KLBF	0.000	0.001	-0.003	-0.004	0.001	0.002	0.001	0.001	-0.003	-0.001
HRUM	0.012	-0.004	0.017	0.017	0.003	0.000	0.005	0.001	0.007	-0.007
ITMG	0.010	0.000	0.003	0.000	0.002	0.006	0.005	0.002	-0.002	0.005
MDKA	0.000	-0.005	0.016	0.003	0.003	0.005	0.003	0.003	0.011	0.006
MEDC	-0.002	-0.009	0.008	-0.007	0.005	0.006	0.004	0.005	-0.002	-0.005
PGAS	0.005	0.000	0.009	-0.004	0.005	0.010	0.006	0.005	-0.003	0.002
PTBA	0.010	0.003	0.006	0.002	0.002	0.004	0.003	0.001	0.002	0.006
TLKM	0.003	-0.001	0.003	0.002	0.002	0.004	0.003	0.002	0.001	0.005
TBIG	-0.002	-0.002	0.007	0.011	0.000	-0.004	-0.002	0.000	0.009	-0.003
Code	INCO	KLBF	HRUM	ITMG	MDKA	MEDC	PGAS	PTBA	TLKM	TBIG
ADRO	0.002	0.000	0.012	0.010	0.000	-0.002	0.005	0.010	0.003	-0.002
AMRT	-0.001	0.001	-0.004	0.000	-0.005	-0.009	0.000	0.003	-0.001	-0.002
ANTM	0.014	-0.003	0.017	0.003	0.016	0.008	0.009	0.006	0.003	0.007
ARTO	0.002	-0.004	0.017	0.000	0.003	-0.007	-0.004	0.002	0.002	0.011
BBCA	0.002	0.001	0.003	0.002	0.003	0.005	0.005	0.002	0.002	0.000
BBNI	0.005	0.002	0.000	0.006	0.005	0.006	0.010	0.004	0.004	-0.004
BBRI	0.005	0.001	0.005	0.005	0.003	0.004	0.006	0.003	0.003	-0.002

BMRI	0.002	0.001	0.001	0.002	0.003	0.005	0.005	0.001	0.002	0.000
EMTK	0.006	-0.003	0.007	-0.002	0.011	-0.002	-0.003	0.002	0.001	0.009
ESSA	0.006	-0.001	-0.007	0.005	0.006	-0.005	0.002	0.006	0.005	-0.003
INCO	0.014	-0.002	0.009	0.007	0.010	0.002	0.005	0.005	0.002	0.002
KLBF	-0.002	0.002	-0.002	-0.001	-0.002	0.001	0.002	0.000	0.000	-0.003
HRUM	0.009	-0.002	0.061	0.012	0.004	0.007	0.004	0.013	0.005	0.008
ITMG	0.007	-0.001	0.012	0.023	0.001	0.005	0.011	0.011	0.006	-0.003
MDKA	0.010	-0.002	0.004	0.001	0.016	0.003	0.005	0.002	0.002	0.005
MEDC	0.002	0.001	0.007	0.005	0.003	0.027	0.009	0.001	0.004	-0.001
PGAS	0.005	0.002	0.004	0.011	0.005	0.009	0.017	0.008	0.005	-0.004
PTBA	0.005	0.000	0.013	0.011	0.002	0.001	0.008	0.011	0.004	-0.002
TLKM	0.002	0.000	0.005	0.006	0.002	0.004	0.005	0.004	0.005	-0.003
TBIG	0.002	-0.003	0.008	-0.003	0.005	-0.001	-0.004	-0.002	-0.003	0.013

Table 10: Variance and Covariance of BSE Sensex

Code	ASPN	AXBK	BJFN	BJFS	HCLT	LART	MAH	NTPC	PGRD	SBI
M										
ASPN	0.008	0.001	0.005	0.004	0.003	0.002	-0.001	0.001	0.000	0.001
AXBK	0.001	0.008	0.007	0.007	0.000	0.004	0.002	0.003	0.002	0.006
BJFN	0.005	0.007	0.015	0.017	0.001	0.005	0.003	0.003	0.003	0.008
BJFS	0.004	0.007	0.017	0.021	0.000	0.007	0.003	0.002	0.003	0.008
HCLT	0.003	0.000	0.001	0.000	0.008	0.001	0.000	-0.001	0.000	-0.002
LART	0.002	0.004	0.005	0.007	0.001	0.004	0.002	0.002	0.002	0.005
MAH	-0.001	0.002	0.003	0.003	0.000	0.002	0.006	0.001	0.001	0.003
M										
NTPC	0.001	0.003	0.003	0.002	-0.001	0.002	0.001	0.007	0.003	0.005
PGRD	0.000	0.002	0.003	0.003	0.000	0.002	0.001	0.003	0.003	0.003
SBI	0.001	0.006	0.008	0.008	-0.002	0.005	0.003	0.005	0.003	0.012
ICBK	0.003	0.005	0.006	0.007	-0.001	0.004	0.002	0.003	0.002	0.007
INBK	0.004	0.008	0.014	0.014	-0.001	0.006	0.004	0.006	0.003	0.011
INFY	0.002	0.001	0.003	0.003	0.006	0.001	0.000	-0.002	0.000	0.000
ITC	0.001	0.002	0.004	0.004	0.000	0.002	0.002	0.002	0.001	0.002
SUN	0.002	0.001	0.004	0.005	0.002	0.002	0.000	0.000	0.000	0.002
TISC	0.004	0.007	0.012	0.014	0.000	0.005	0.001	0.002	0.002	0.007
TEML	-0.001	0.000	-0.003	-0.005	0.002	0.000	0.001	-0.001	-0.001	-0.003
TITN	0.005	0.002	0.007	0.008	0.003	0.003	0.001	0.001	0.001	0.002
ULTC	0.003	0.002	0.003	0.004	0.002	0.003	0.001	0.001	0.001	0.003
WIPR	0.002	0.000	0.003	0.004	0.006	0.001	0.000	-0.003	-0.001	-0.001
L										
Code	ICBK	INBK	INFY	ITC	SUN	TISC	TEM	TITN	ULTC	WIPR
ASPN	0.003	0.004	0.002	0.001	0.002	0.004	-0.001	0.005	0.003	0.002
AXBK	0.005	0.008	0.001	0.002	0.001	0.007	0.000	0.002	0.002	0.000
BJFN	0.006	0.014	0.003	0.004	0.004	0.012	-0.003	0.007	0.003	0.003
BJFS	0.007	0.014	0.003	0.004	0.005	0.014	-0.005	0.008	0.004	0.004
HCLT	-0.001	-0.001	0.006	0.000	0.002	0.000	0.002	0.003	0.002	0.006
LART	0.004	0.006	0.001	0.002	0.002	0.005	0.000	0.003	0.003	0.001
MAH	0.002	0.004	0.000	0.002	0.000	0.001	0.001	0.001	0.001	0.000
M										

NTPC	0.003	0.006	-0.002	0.002	0.000	0.002	-0.001	0.001	0.001	-0.003
PGRD	0.002	0.003	0.000	0.001	0.000	0.002	-0.001	0.001	0.001	-0.001
SBI	0.007	0.011	0.000	0.002	0.002	0.007	-0.003	0.002	0.003	-0.001
ICBK	0.006	0.008	0.000	0.002	0.002	0.007	-0.001	0.003	0.003	0.000
INBK	0.008	0.019	0.000	0.004	0.003	0.012	-0.003	0.006	0.003	0.000
INFY	0.000	0.000	0.007	0.000	0.003	0.003	0.000	0.003	0.003	0.006
ITC	0.002	0.004	0.000	0.004	0.002	0.002	0.001	0.002	0.001	-0.001
SUN	0.002	0.003	0.003	0.002	0.004	0.005	-0.001	0.002	0.002	0.003
TISC	0.007	0.012	0.003	0.002	0.005	0.018	-0.005	0.004	0.005	0.005
TEML	-0.001	-0.003	0.000	0.001	-0.001	-0.005	0.009	0.000	-0.001	-0.001
TITN	0.003	0.006	0.003	0.002	0.002	0.004	0.000	0.007	0.002	0.003
ULTC	0.003	0.003	0.003	0.001	0.002	0.005	-0.001	0.002	0.005	0.002
WIPR	0.000	0.000	0.006	-0.001	0.003	0.005	-0.001	0.003	0.002	0.009

Based on the table above, it is evident that the covariance between stocks shows both positive and negative values for both the IDX30 and BSE Sensex indices. This indicates that some stocks move in opposite directions while others move in the same direction. This has implications for portfolio formation. A positive covariance means that if one stock gains, its counterpart is likely to gain as well, and if one stock loses, its counterpart is likely to lose. On the other hand, if two stocks have a negative covariance, gains in one stock may offset losses in the other.

In portfolio formation, there are two approaches. First, portfolio construction can be done by allocating equal weights to each stock. This is achieved by evenly dividing 100% of the total weight among the stocks. For example, if there are 20 stocks in the IDX30 and BSE Sensex indices, each stock would have a proportional weight of 5%. Table 11 shows that the expected return for a portfolio formed from the IDX30 with equal weights is 35.44%, and the corresponding standard deviation is 66.00%. Meanwhile, Table 12 indicates an expected return of 45.49% and a standard deviation of 21.95% for a portfolio formed from the BSE Sensex using the same equal-weight approach.

Table 11: IDX30 Portfolio with Equal Weight

Code	Proportion	Code	Proportion	Code	Proportion	Code	Proportion
ADRO	5%	BBNI	5%	INCO	5%	MEDC	5%
AMRT	5%	BBRI	5%	KLBF	5%	PGAS	5%
ANTM	5%	BMRI	5%	HRUM	5%	PTBA	5%
ARTO	5%	EMTK	5%	ITMG	5%	TLKM	5%
BBCA	5%	ESSA	5%	MDKA	5%	TBIG	5%
Expected Return							35.44%
Standard Deviation							66.00%

Table 12: BSE Sensex Portfolio with Equal Weight

Code	Proportion	Code	Proportion	Code	Proportion	Code	Proportion
ASPN	5%	LART	5%	ICBK	5%	TISC	5%
AXBX	5%	MAHM	5%	INBK	5%	TEML	5%
BJFN	5%	NTPC	5%	INFY	5%	TITN	5%
BJFS	5%	PGRD	5%	ITC	5%	ULTC	5%
HCLT	5%	SBI	5%	SUN	5%	WIPR	5%
Expected Return							45.49%
Standard Deviation							21.95%

To create an optimal portfolio, Solver software in Microsoft Excel is utilized. This software helps determine the most efficient weight allocation based on minimizing risk. According to Table 13, a portfolio formed from the IDX30 index consists of 6 stock issuers with an expected return of 19.97% and a standard deviation of 8.77%. Meanwhile, Table 14 reveals that the optimal portfolio formed from the BSE Sensex index comprises 8 stocks with an expected return of 28.4% and a standard deviation of 4.00%.

Table 13: Optimal Portfolio of IDX30

Code	Proportion
AMRT	4.90%
ESSA	1.00%
INCO	5.30%
KLBF	49.9%
TLKM	19.5%
TBIG	19.4%
Expected Return	19.97%
Standard Deviation	8.77%

Table 14: Optimal Portfolio of BSE Sensex

Code	Proportion
ASPN	9.3%
MAHM	7.38%
NTPC	1.72%
PGRD	33.38%
SUN	18.79%
TEML	19.11%
ULTC	3.16%
WIPR	7.16%
Expected Return	28.4%
Standard Deviation	4.00%

After forming the portfolio, the next step is to evaluate its performance using the Sharpe, Treynor, and Jensen indices. Below is an example calculation of the portfolio performance constructed from the IDX30 index.

Indeks Sharpe

$$\widehat{S}_p = \frac{19.97\% - 3.85\%}{8.77\%} = 1.84$$

Indeks Treynor

$$\widehat{T}_p = \frac{19.97\% - 3.85\%}{34\%} = 0.48$$

Indeks Jensen

$$\bar{J}_p = 19.97\% - (3.85\% + (12\% - 3.85\%) \times 34\%) = 0.13$$

The same calculations were performed for the portfolio formed from the BSE Sensex index. The summary of performance calculations is summarized in the Table 14.

Table 15: Optimal Portfolio Performance

	IDX30	BSE Sensex
Indeks Sharpe	1.84	2.16
Indeks Treynor	0.48	0.42
Indeks Jensen	0.13	0.14

Tables 11 through Table 14 provide insights into portfolio performance based on equal-weighted and optimal weight allocations. When considering equal-weighted portfolios, the expected return for the IDX30 index stands at 35.44%, while the BSE Sensex index yields 45.49%. However, in the case of the optimal portfolio, the expected return decreases to 19.97% for IDX30 and 28.4% for BSE Sensex. Notably, the standard deviation—indicating risk—differs significantly. The equal-weighted portfolios exhibit a risk of 66.66% (IDX30) and 21.95% (BSE Sensex), whereas the optimal portfolios have substantially lower risk: 8.77% (IDX30) and 4% (BSE Sensex). Consequently, the optimal portfolio achieves a lower risk level while sacrificing some expected return compared to the equal-weighted approach.

Examining Tables 13 and 14, we observe that the optimal portfolio formed using the BSE Sensex index outperforms its counterpart based on the IDX30 index. Specifically, the BSE Sensex-based optimal portfolio

delivers a higher expected return and lower standard deviation. This finding underscores the importance of index selection in constructing efficient portfolios.

Performance metrics analysis presented in Table 15. the IDX30 portfolio shows a Sharpe ratio of 1.84. a Treynor index of 0.48. and a Jensen index of 0.13. Meanwhile. the BSE Sensex portfolio demonstrates a Sharpe ratio of 2.16. a Treynor index of 0.42. and a Jensen index of 0.14. These metrics suggest that the BSE Sensex portfolio outperforms the IDX30 portfolio in terms of Sharpe and Jensen indices. while the IDX30 portfolio shows better performance according to the Treynor index.

In addition to performing optimal portfolio construction and performance measurement. we also examine the differences between the optimal portfolio outcomes and the risk-free rate. as well as the individual stock standard deviations due to during the period from August 2020 to January 2023. stock markets experienced fluctuations. prompting risk-averse investors to consider stock investments alongside risk-free investments. Based on Table 16 and Table 17. it can be seen that the expected returns of the optimal portfolios from both the IDX30 and BSE Sensex indices exceed the risk-free rates. The IDX30 portfolio exhibits lower risk compared to individual stock risks. However. the optimal portfolio from the BSE Sensex index shows higher risk than individual stock risks.

Table 16: Risk Free Rate and Return Portofolio of IDX30 and BSE Sensex

Optimum Portfolio	Risk Free Rate	Return Portofolio
IDX30	3.85%	19.97%
BSE Sensex	4.62%	22.00%

Table 17: Standar Deviation Comparison Between of Individual Stock dan Portofolio

Optimum Portfolio	Code	Yearly Standard Deviation of Individual Stock	Yearly Standard Deviation of Portfolio
IDX30	AMRT	0.4648	0.087
	ESSA	0.8124	
	INCO	0.4099	
	KLBF	0.1549	
	TLKM	0.2449	
	TBIG	0.3950	
BSE Sensex	ASPN	0.0240	0.046
	MAHM	0.0180	
	NTPC	0.0210	
	PGRD	0.0090	
	SUN	0.0120	
	TEML	0.0270	
	ULTC	0.0150	
	WIPR	0.0270	

Source: Processed data (2024)

4. Conclusion

The formation of an optimal portfolio using the Markowitz method has been carried out on two indices. namely IDX30 and BSE Sensex. For the optimal portfolio formed from IDX30. the portfolio consists of 6 stocks with the following proportions: AMRT (4.9%). ESSA (1%). INCO (5.3%). KLBF (49.9%). TLKM (19.5%). and TBIG (19.4%). The annual expected return of the formed portfolio is 19.97% with a risk of 8.77%. Meanwhile. performance measurement using the Sharpe index shows a value of 1.84. using the Treynor index shows 0.48. and using the Jensen index shows 0.13.

The formation of a portfolio using the Markowitz method on the BSE Sensex index resulted in a portfolio consisting of 8 stocks with the following proportions: ASPN (9.3%). MAHM (7.38%). NTPC (1.72%). PGRD (33.38%). SUN (18.79%). TEML (19.11%). ULTC (3.16%). and WIPR (7.16%). The annual expected return

obtained is 28.4% with a risk of 4%. The performance measurement of the optimal portfolio using the Sharpe index shows a value of 2.16. using the Treynor index shows 0.42. and using the Jensen index shows 0.14.

When looking at the results from the returns and standard deviations. the optimal portfolio formed from the BSE Sensex index has a higher return with a lower risk compared to the portfolio formed from the IDX30 index. For portfolio performance measurement using the Sharpe and Jensen indices. the optimal portfolio formed from the BSE Sensex shows better performance compared to the optimal portfolio formed from IDX30. However. using the Treynor performance measurement. the optimal portfolio formed from IDX30 shows a better value.

The optimal portfolios formed on the IDX30 and BSE Sensex indices have lower risks but with lower expected returns compared to equally weighted portfolios. This indicates that the formation of an optimal portfolio using the Markowitz method can reduce risk but does not necessarily provide better expected returns compared to equally weighted portfolios.

However. if investments are made in risk-free instruments. the optimal portfolio formed using the Markowitz method provides better expected returns. These optimal portfolios also offer lower risks compared to the individual stock risks.

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Institutional Possession, Supervisory Board Size, External Auditor Quality, and Profit Quality

Erna Erna¹, Etty Murwaningsari², Murtanto Murtanto³

¹ Doctoral Student in the Accounting Department at Trisakti University, Jakarta, Indonesia.
Email: erna221021814003@std.trisakti.ac.id

² Trisakti University, Jakarta, Indonesia. Email: etty.murwaningsari@trisakti.ac.id

³ Trisakti University, Jakarta, Indonesia. Email: murtanto@trisakti.ac.id

Correspondence: Erna Erna, Email: erna221021814003@std.trisakti.ac.id

Abstract

This study aims to reveal the determinants of profit quality based on governance factors. Specifically, the proposed factors are institutional possession (IP), supervisory board size (SBS), and an external reputable auditor. Besides, this study intends to examine the IP to moderate the relationship between SBS and profit quality. By employing 12 agricultural companies in the Indonesian capital market for ten years, from 2013 to 2022, this study obtains 120 observations and analyzes the data by regression model with pooling data. After that, this study demonstrates that IP, the supervisory board size, and reputable external auditor quality positively affect profit quality. The negative interaction effect between IP and supervisory board size (IP*SBS) on profit quality is available: The smaller the SBS, the higher the profit quality, and this tendency happens when institutional possession decreases. In other words, the IP and SBS have substitution roles to create profit quality.

Keywords: Financial Reporting, Earning Quality, The Big-Four Auditors, Institutional Ownership

1. Introduction

Financial reporting timeliness becomes the relevant attribute for public investors to assess its quality (Ashraf et al., 2020), and some scholars confirm that this timeliness is associated with market reaction (Pattinaja, 2023; Tirza & Prasetyo, 2024). In her study, Pattinaja (2023) concludes that firms that publish early have higher market responses than those that publish promptly and late. Meanwhile, Tirza and Prasetyo (2024) demonstrate that the market reacts negatively to companies with interim financial reports on the day of the delay and afterward. Tirza and Prasetyo (2024) declare that companies must pay a fine as a sanction for delayed reporting of financial statements.

Ideally, the financial reports delivered to the capital market should inform the actual condition if they want to be utilized (Gardi et al., 2023). However, not all companies perform in this situation. For example, Enron, an energy company in the United States, deliberately inflated revenue of USD600 million and hid debt of USD1,200 million, and this case was revealed at the end of 2001 (Sulistiyono, 2018). In Indonesia, a similar case occurred in 2002 when Kimia Farma Tbk inflated net profits in its financial reports in 2021 (Herlambang et al., 2017).

The financial reports must have quality if their users want to utilize them. Academically, discretionary accruals based on the model of Jones (1991), Dechow et al. (1995), and Kothari et al. (2005) can be used to measure this quality (Hasan et al., 2022). Besides, the operating cash flow to profit before interest and taxes ratio is another measurement used by scholars (Hanif et al., 2023; Murniati, 2019; Murniati et al., 2018; Ramadan, 2015; Solikhah et al., 2022).

The relationship between institutional ownership and profit quality attracted attention from previous scholars utilizing the capital market data from Indonesia (Murniati, 2019; Murniati et al., 2018; Solikhah et al., 2022), Pakistan and the United Kingdom (Hasan et al., 2022), and Saudi Arabia (Aldoseri & Hussein, 2024). Unfortunately, their consensus disappears. For instance, Murniati et al. (2018), Murniati (2019), Aldoseri and Hussein (2024), and Hasan et al. (2022) show insignificant associations. However, Solikhah et al. (2022) demonstrate a positive tendency of this ownership toward earnings quality.

Similarly, the relationship between supervisory board size (SBS) and profit quality attracted attention from previous scholars utilizing capital market data from Nigeria (Egbunike & Odum, 2018), East African countries (Githaiga et al., 2022), Egypt (El-Dyasty & Elamer, 2023), Saudi Arabia (Aldoseri & Hussein, 2024). Unfortunately, this inconsistent evidence exists. Egbunike and Odum (2018) display the positive relationship between SBS and profit quality. Aligning with them, Hasan et al. (2022) demonstrate that the more supervisory boards there are, the less discretionary accrual there is, increasing earnings quality. Unfortunately, Githaiga et al. (2022) and El-Dyasty & Elamer (2023) exhibit that the more boards, the higher discretionary accrual, decreasing earning quality. Meanwhile, Aldoseri and Hussein (2024) find no association.

Based on the previous research, the quality of external auditors has a different effect on earnings quality. Utilizing data from the capital market in Thailand, Piyawiboon (2015) proves that the existence of a public accounting firm affiliated with the Big Four can reduce errors in the DA model, which means improving profit quality, confirmed by Hasan et al. (2022) using Pakistan and the United Kingdom firms as their samples and El-Dynasty and Elamer (2023) using the issuers from Egypt. Moreover, Murniati et al. (2018) and Murniati (2019) from Indonesia illustrate the positive influence of external auditor reputation on profit quality, measured by operating cash flows to net earnings before interest and taxes ratio. In contrast, Tridig S. et al. (2022) confirm no relationship.

By mentioning these results, this study analyzes the earnings quality determinants based on institutional ownership (IO), supervisory board size, and reputable external auditors. Because of the inadequate evidence, this study proposes to examine the moderating effect of IO on the association between SBS and profit quality. By proving this impact, this study can contribute to a profit-quality model based on a corporate governance perspective.

Unlike other scholars using manufacturing companies (Egbunike & Odum, 2018; Murniati, 2019; Murniati et al., 2018; Ramadan, 2015; Solikhah et al., 2022), agro and food, resource, technology, and consumer goods companies (Piyawiboon, 2015), retail companies (Tridig S. et al., 2022), non-financial firms (Aldoseri & Hussein, 2024), and all listed enterprises (El-Dyasty & Elamer, 2023; Githaiga et al., 2022; Hasan et al., 2022), this study uses explicitly the agricultural sector in Indonesia. In Indonesia, this sector has become a primary (Arham, 2020), the buffer for national food security and defense (Rumawas et al., 2021), and a supplier of food needs for the community (Setiartiti, 2021).

2. Literature Reviews and Hypothesis Development

2.1. Agency Theory

The agency theory focuses on the conflict between managers and shareholders. This conflict happens because managers, as agents, do not maximize shareholder interests (Jensen & Meckling, 1976). Instead, they maximize their interests by investing funds into shareholder wealth-unrelated projects, such as buying deluxe jets and apartments and taking luxurious vacations (Titman et al., 2018). Therefore, to prevent managers from these actions, the existing shareholders sell their shares to institutions (Davis & García-Cestona, 2023; Denis & Kruse, 2000) and appoint a supervisory board (Denis & Kruse, 2000).

2.2. Institutional ownership and the quality of profit

The institution is one of the owners having shares in a company. Its examples include banks, insurance companies, private foundations, and investment companies (Solikhah et al., 2022). These institutions function as the corporate governance mechanism (Hasan et al., 2022; Javaid et al., 2021), monitoring managers to follow and fulfill their wishes (Solikhah et al., 2022). In their research, Solikhah et al. (2022) point out that institutions with a significant share portion can increase the profit quality, measured by operating cash flow to earnings before interest and taxes ratio. By this explanation, the first hypothesis is stated below.

H₁: The institutional possession positively affects the quality of the profits.

2.3. Supervisory board size and quality of profit

Effective governance is based on the size of the supervisory board. Agency theory declares that a small board is needed to coordinate effortlessly and effectively monitor management (Lipton & Lorsch, 1992). Therefore, a smaller supervisory board is preferred to reduce earnings management, as Githaiga et al. (2022) and El-Dyasty and Elamer (2023) perform based on the model of Decow et al. (1995) and Kothari et al. (2005), respectively. Thus, the second hypothesis is declared below.

H₂: The supervisory board size negatively influences profit quality.

2.4. Reputable external auditor and the quality of profit

The use of public accountant firms affiliated with the Big-4 auditor group intends to make the market believe in the quality of the financial report, mirrored by the increase in profit quality. In their study using auditor ordinal classification, Murniati et al. (2018) and Murniati (2019) conclude that the more qualified auditor classification, the more qualified earnings. When earnings management is measured by the discretionary accrual, Piyawiboon (2015), El-Dynasty and Elamer (2023), and Hasan et al. (2022) exhibit that companies using Big-4 auditors have lower discretionary accrual than those employing non-Big-4. Thus, the third hypothesis is declared below.

H₃: The quality of external auditors associated with the big four positively influences profit quality.

3. Research Methods

3.1. Variable definition

This investigation involves two kinds of variables. The first dependent variable is profit quality (PQ). Following Ramadan (2015), Murniati (2019), Solikhah et al. (2022), and Hanif et al. (2023), this research uses the operating cash flow to profit before interest and taxes ratio to measure PQ. The second is institutional possession quantified by the stock portion belonging to the institution by denoting Murniati (2019). The third is supervisory board size, quantified by people in this position by mentioning Githaiga et al. (2022) and El-Dyasty et al. (2023). The fourth is external auditor quality, measured by a dummy variable, DBIG4, i.e., one and zero for the companies utilizing the big four and non-big four, respectively. This quality measurement denotes Kawedar et al. (2021) and Hasan et al. (2022). Finally, as the control variable, this study utilizes firm size measured by the natural logarithm of total assets based on Ramadan (2015), Hamdan (2020), Hanif et al. (2023), and Hasan et al. (2022).

3.2. Population and Samples

This research population is companies in the agricultural companies in the Indonesian capital market, recorded from 2013 to 2022. Based on the record consistency in this period, 19 companies were obtained as a population number (PN). After knowing this number, the next step is to calculate the number of samples (NS) representing the population with the Slovin formulation cited from Firdaus (2021) at an error limit (EL) of 10% (see equation 1).

$$NS = \frac{PN}{1+PN(EL)^2} \dots\dots\dots \text{(Equation 1)}$$

By this formula, NS is $\frac{19}{1+19(10\%)(10\%)} = \frac{19}{1.19} = 15.97 \approx 16$ companies. Furthermore, this study uses a simple random sampling method to select them. However, these companies cannot be fully used as samples. Therefore, this study uses trial and error to yield the number of companies with upright estimators to prove the hypotheses and a finding. Based on this technique, this study only utilizes 12 firms: (1) Astra Agro Lestari Tbk. (AALI), (2) Bisi International Tbk. (BISI), (3) Eagle High Plantation Tbk. (BWPT), (4) Dharma Samudera Fishing Industries Tbk. (DSFI), (5) Inti Agri Resources Tbk. (IIKP), (6) PP London Sumatra Indonesia Tbk. (LSIP), (7) Sampoerna Agro Tbk. (SGRO), (8) Salim Ivomas Pratama Tbk. (SIMP), (9) SMART Tbk. (SMAR), (10) Sawit Sumbermas Sarana Tbk. (SSMS), (11) Tunas Baru Lampung Tbk. (TBLA), and (12) Bakrie Sumatera Plantations Tbk (UNSP).

3.3. Method to collect the data

In this study, the archive method was used to collect data. According to Hartono (2014), this method helps obtain secondary data. The secondary data used come from:

1. IDX Fact Books 2014, 2015, 2016, 2017, 2018, and 2019 to identify the names and number of agricultural sector companies as the relevant population in this study. These books can be downloaded at <https://www.idx.co.id/id/data-pasar/laporan-statistik/fact-book>.
2. The annual reports from 2013 to 2022 of the companies becoming the samples. These reports can be downloaded from their official website or www.idx.co.id.

3.4. Data analysis method

This study uses a pooling data regression model that combines cross-site data (i) and time series (t) for data analysis. Furthermore, to examine hypotheses one, two, and three, the probability value of the t-statistic of the regression coefficients β_1 , β_2 , and β_3 in equation two are used.

$$PQ_{it} = \beta_0 + \beta_1 IP_{it} + \beta_2 SBS_{it} + \beta_3 DBIG4_{it} + \beta_4 IP * SBS_{it} + \beta_4 LN(TA) + \varepsilon_{1it} \text{ (Equation 2)}$$

Additionally, this study uses the interaction between institutional possession (IP) and supervisory board size (SBS) to prove new evidence. According to Hartono (2014), interaction is one of the ways to establish a moderating effect (Hartono, 2014). Before estimating the regression coefficients, the classical assumptions, like non-multicollinearity, homoskedasticity, non-autocorrelation, and normality, must be achieved. Then, to perform the related detection, this study uses the matrix correlation, White (Gujarati et al., 2019), runs, and Kolmogorov-Smirnov tests, respectively (Ghozali, 2021).

4. Result and Discussion

4.1. Descriptive Statistics

Because of a ratio scale to measure profit quality, institutional ownership, and supervisory board size, this study uses total observation (N), maximum, minimum, mean, and standard deviation, as exhibited in Table 1:

- Profit quality calculated by the operating cash flow to profit before interest and taxes ratio has a minimum, maximum, mean, and standard deviation of -1.64, 8.59, 0.8546, and 1.15239.
- Institutional possession quantified by its share percentage has a minimum, maximum, mean, and standard deviation of 3.13, 97.20, 62.5253, and 21.92230.
- Supervisory board size measured by its total has a minimum, maximum, mean, and standard deviation of 2, 9, 4.39, and 1.712.
- Firm size counted by the natural logarithm of total assets has a minimum, maximum, mean, and standard deviation of 12.44, 17.57, 15.7311, and 1.52521.

Table 1: Descriptive statistics for the profit quality, institutional possession, supervisory board size, and company size

Variable	N	Minimum	Maximum	Mean	Std. Deviation
PQ (decimal)	120	-1.64	8.59	0.8546	1.15239
IP (%)	120	3.13	97.20	62.5253	21.92230
SBS	120	2	9	4.39	1.712
LN(TA) (decimal)	120	12.44	17.57	15.7311	1.52521

Moreover, to measure external auditor quality with a nominal scale, the frequency reflects the firms audited by public accounting firms affiliated with the big four auditors, as presented in Table 2. Based on the data observation from 2013 to 2022, this study obtained five companies that consistently hire non-Big-4 auditors, i.e., SMAR, DSFI, IIKP, TBLA, and UNSP; six firms that steadily employed Big-4 auditors, i.e., BISI, AALI, LSIP, SGRO, SIMP, and SSMS; and one inconsistent firm: BWPT. In 2013 and 2014, BWPT used a non-Big-4 auditor but changed to a big-four auditor between 2015 and 2018 and utilized a non-Big-4 auditor again from 2019 to 2022.

Table 2: Descriptive statistics for external auditor quality

Description	Firm Code	Total Company	Total Observation
The consistent companies using public accounting firms unaffiliated with the Big Four auditors	SMAR, DSFI, IIKP, TBLA, and UNSP	5	50
The consistent companies utilizing public accounting firms affiliated with the Big Four auditors	BISI, AALI, LSIP, SGRO, SIMP, and SSMS	6	60
The inconsistent companies utilizing public accounting firms affiliated or unaffiliated with the Big Four auditors	BWPT	1	10
Total		12	120

4.2. Matrix Correlation and Multicollinearity Detection

Table 3 exhibits the Pearson correlation (PC) matrix among the independent variables (see Panel A) and between the dependent and independent variables (see Panel B). In Panel A, the correlations among independent variables are between 0.029 and 0.801, showing weak to solid power, as Akoglu (2018) declares. The largest is between IP and IP*SBS: 0.801. By mentioning Gujarati et al. (2019) and Ghazali (2021), the multicollinearity does not become a problem in this case because the second regression model estimated demonstrates a significant impact of IP*SBS, supported by a low R-square of 0.146039 (see Table 5). Additionally, the correlation between IP and PQ, SBS and PQ, DBIG4 and PQ, LN(TA) and PQ, and IP*SBS and PQ in Panel B of Table 3 is 0.302, 0.186, 0.247, 0.092, and 0.261, respectively. By referring to Akoglu (2018), it displays weak power because it is less than 0.4.

Table 3: Matrix Correlation Result

Panel A. Correlation among independent variables			
Correlation	Pearson Correlation	Correlation	Pearson Correlation
IP ↔ SBS	0.282	SBS ↔ LN(TA)	0.553
IP ↔ DBIG4	0.303	SBS ↔ IP*SBS	0.801
IP ↔ LN(TA)	0.391	DBIG ↔ LN(TA)	0.332
IP ↔ IP*SBS	0.766	DBIG ↔ IP*SBS	0.142
SBS ↔ DBIG4	0.029	LN(TA) ↔ IP*IBS	0.536
Panel B. Correlation between independent and dependent variables			
Correlation	Pearson Correlation	Correlation	Pearson Correlation
IP ↔ PQ	0.302	LN(TA) ↔ PQ	0.092
SBS ↔ PQ	0.186	IP*SBS ↔ PQ	0.261
DBIG4 ↔ PQ	0.247		

4.3. Heteroskedasticity, Autocorrelation, and Normality Testing Results

By utilizing a White testing result, this study shows that homoscedasticity exists because the probability of Chi-Square based on Obs*R-squared is still insignificant at 1% level: 0.0398 (see Table 4). Furthermore, this study shows that autocorrelation is unavailable because the Z-statistical asymptotic probability (2-tailed) is still above the 5% significant level: 0.271 (see Table 4). Finally, the normality test result is not achieved because the asymptotic probability is lower than 1% level: 0.0000 (see Table 4). According to Bowerman & O'Connell (2003), the central limit theorem declares that the normality can be ignored if the observation is extensive. Using the sample terminology, the large exists if above 30 as the total exists (Misbahuddin & Hasan, 2013). In this research context, the observational number is 120, which is considered gigantic because it is higher than 30.

Table 4: Heteroskedasticity, Autocorrelation, and Normality Testing Results

The name of the test	Related Model	Statistical Information	Value
Heteroskedasticity: White Testing	RESID ² = f(IP ² , SBS ² , DBIG ² , LN(TA) ² , (IP*SBS) ²	Obs*R-squared	11.65977
		Probability of Chi-Square (5)	0.0398
Autocorrelation: Runs testing	Single serial residuals	Median test value	-0.10940
		Number of runs	55
		Z-statistic	-1.100
		Asymptotic probability (2-tailed)	0.271
Normality testing: Kolmogorov-Smirnov (KS)	Serial serial residuals	Total observations	120
		Z-statistic of KS	2.054
		Asymptotic probability (2-tailed)	0.000

4.4. The estimation result of the regression model

Table 5 shows the t-statistical probability for regression coefficient IP, SBS, and DBIG4 in the second regression model are 0.0086, 0.0129, and 0.0446. Because these values are significant at α of 5%, the first, second, and third null hypotheses are rejected. Thus, the first, second, and third alternative hypotheses are accepted, declaring that institutional possession, supervisory board size, and external auditor quality positively affect profit quality.

From the same table, the t-statistical probability value for the IP*SBS regression coefficient in the second regression model is 0.0572. Because this value is significant at α of 10%, the moderating effect of institutional ownership on the association between supervisory board size and profit quality is available, supported by the increasing adjusted R-square from 0.126063 in the first model to 0.146039 in the second model.

Table 5: The estimation result of the regression model: The effect of institutional ownership, external auditor quality, and their interaction on profit quality with supervisory board independence as the control variable

Description	The first regression model without interaction between IO and SBS			The second regression model with interaction between IO and SBS			Statistical Conclusion
	Coefficient	t-statistic	Probability	Coefficient	t-statistic	Probability	
C	1.540203	1.354794	0.1781	0.272122	0.208790	0.8350	-
IP	0.013094	2.598872	0.0106	0.040773	2.674449	0.0086	H ₁ is accepted
SBS	0.150234	2.108954	0.0371	0.529977	2.525490	0.0129	H ₂ is accepted
DBIG4	0.537087	2.457566	0.0155	0.448597	2.030870	0.0446	H ₃ is accepted
LN(TA)	-0.155774	-1.816584	0.0719	-0.191099	-2.203205	0.0296	-
IP*SBS	n.a.	n.a.	n.a.	-0.005358	-1.920961	0.0572	Novelty is confirmed
Adjusted R ²	0.126063			0.146039			

4.5. Discussion

The first statistical hypothesis examination shows that institutional ownership positively affects profit quality. Institutions with a significant company share can effectively monitor managers through proxy fights. If institutions do it, other candidates with better competence may replace the existing managers performing earning management. Therefore, managers tend to reduce their tendency to manage profits and yield qualified profits. With this positive effect, this study aligns with agency theory in the monitoring context and Solikhah et al. (2022).

The second hypothesis testing exhibits that the supervisory board size positively affects profit quality. Hence, this evidence does not support the agency theory requiring a few supervisory board members. Instead, it affirms the resource dependence theory based on the bulky supervising board members (Villanueva-Villar et al., 2016). Besides, securing essential and precious resources and minimizing uncertainty and transaction costs are part of their ability to elevate firm performance (Pfeffer, 1972; Zahra & Pearce, 1989). In the earnings quality context, this performance is reflected by the decrease in earnings management when the big supervisory boards exist, as documented by Hasan et al. (2022).

The third statistical hypothesis testing illustrates that external audit quality positively affects profit quality. This result indicates that the audit results by public accounting firms affiliated with the Big Four auditors are of higher quality than those of the unaffiliated. This quality is inseparable from auditors' experience and expertise in auditing financial statements. With this positive influence, this study's results are in line with Murniati et al. (2018), Githaiga et al. (2022), and El-Dyasty and Elamer (2023).

Based on the evidence, institutional ownership can strengthen the effect of supervisory board size on profit quality with a negative sign; it indicates the substitution role between the institution and supervisory board in monitoring management. The small board size is needed to elevate earnings quality when institutional ownership increases, and vice versa. In other words, the agency theory recommending the small supervisory board is confirmed.

4.6. Implications

Based on these research results, it is recommended that the companies employ a public accounting firm affiliated with the Big Four auditors to guarantee profit quality. To realize this condition, the company must provide much money as compensation to signal the market positively. Additionally, when a portion of institutional ownership is high, the firms are expected to select small members of supervisory boards to create a high-profit quality.

5. Conclusion

This study examines and analyzes the effect of institutional ownership, the quality of external auditors, and the interaction of institutional ownership with reputable external auditors on profit quality in the agricultural sector issuers on the Indonesia Stock Exchange. By analyzing data between 2013 and 2022 and utilizing 12 companies as samples, the study concludes that institutional ownership, supervisory board size, and external auditor quality positively influence profit quality.

Educationally, this study has several limitations. First, the sample size includes only one industrial sector, and second, only two variables were used. These issues provide an opportunity for future investigators to overcome this limitation.

- a. Regarding the first limitation, they are advised to use multi-industry firms, such as non-financial companies. By using them, the conclusions drawn can be broadly valid.
- b. Regarding the second limitation, the following researchers suggested utilizing managerial ownership and supervisory board diversity as additional primary independent variables in their research model.

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Assessment of the Impacts of Energy Poverty on Small and Medium Businesses in Benin City, Nigeria

L. E. Oshio¹, R. O. Owenvbiugue², H. E. Chukwuemeka³

^{1,2,3} Department of Vocational and Technical Education, Faculty of Education, University of Benin, Benin City

Correspondence: Email: emeribennaemeka@yahoo.com

Abstract

Small and medium enterprises (SMEs) coupled with the availability of stable and affordable electricity grid supply are crucial towards meeting key Sustainable Development Goals, especially poverty eradication, as well as addressing youth unemployment in developing countries. Unfortunately, electricity grid supply shortage remains a major setback to economic growth, where over 70% of Nigeria's population makes their livelihood from SMEs. The present study hence aimed to examine the effects of electricity grid supply inadequacy on daily operations of small businesses in select quarters in Benn City, Edo State. A total of ten (10) small businesses were randomly sampled using questionnaire method across ten (10) quarters in the study area. The study found that majority of business owners (49.2%) rely on electricity grid supply for their daily operations. On whether electricity grid supply is reliable, 49.3% reported that supply is inconsistent (on and off), while 35.4% reported that supply is inadequate for their businesses. A total of 38.6% of the sampled respondents reported that electricity grid supply is only available for a period of 4-5hr/day in their quarters, 28.5% reported 6-10hr/day in other quarters, while 22.9% reported that supply is only available for less than 3hrs/day in their quarters. In terms of the effect of poor electricity grid supply on business operations, declining income level ranked highest (35.3%), followed by extra expenses incurred by business owners on alternative electricity supply especially power generating set popularly known as gen set (24.8%) and low patronage of clients especially soft drink and beer parlour businesses (17.5%).

Keywords: Electricity Grid Supply, Small and Medium Enterprise, Income Decline, SDGs, Benin City

1. Introduction

All over the world, small and medium emprise businesses play a major role in livelihood sustenance and national development especially as such businesses require small amount to set up. According to (Olaye et al. 2018) such businesses have proved to be a major tool adopted by the developed nations to attain socio-economic development. Global statistics acknowledge that small businesses are key providers of employment. For instance, in the United States of America (USA), small businesses accounted for 64% of new jobs created between 1993 and 2011 (Aribaba et al., 2019). Among the Organization for Economic Co-operation and Development (OECD) nations, small businesses account for 60– 70% of jobs created annually (OECD, 2015). In developing economies on the other hand, small and medium-sized enterprises (SMEs) are widely recognized as the engine of economic growth and equitable development (Olaniyi and Adekanmbi, 2022). Aside from the potential for self-sufficient industrialization utilizing local raw resources, SMEs are better positioned to increase employment,

ensure equitable distribution of industrial development, and assist the rise of non-oil exports (Aremu, 2010; John and Willie Ebri, 2022).

In another study, SMEs are considered a veritable tool for economic growth and development. They play a key role in promoting prosperity by creating new jobs and increasing a region's economic prosperity (Maksimov et al., 2017). Due to the importance of small businesses, governments in developing and developed nations see them as a means of employment, innovation and wealth creation (Mills and McCarthy, 2016). Small business are important for the growth of products and services' productivity while it creates employment at a smaller financial cost, particularly in the rapidly developing service sector (Adeosun and Shittu, 2022). More than half of the jobs in developing countries are created by SMEs, and they dominate the private sector space in the same economies (Kumar, 2017; Lorenz and Pommet, 2018).

In Nigeria, small businesses constituting 10 to 99 persons increased from a little above 15 million in 2010 to 36,994,578 in 2013, while large-scale industries constituting 100 persons and above pegged at over 2,000 in 2010 and increased to 4,670 in 2013 (SMEDAN, 2014). Small businesses account for 70% of industrial employment and about 50% of manufacturing output (Ogunmuyiwa and Okunleye, 2019). Despite the strategic role of SMEs in poverty reduction, these businesses in Nigeria continue to face constraints from making meaningful contributions. Apart from financing issues (inadequate access to funding) and high tax rates, poor personnel management, poor marketing, poor management and low entrepreneurial skill base, lack of infrastructure, unfavorable tariff policy affecting SMEs in developing countries as reported by Evbuomwan, et al., (2013); World Bank, (2015), Ilegbinosa and Jumbo, (2015) Aderemi et al. (2019) Aderemi et al. (2020) and John and Ebri (2022), energy poverty and/or shortage is another factor limiting the growth of SMEs. As a result, the Global Entrepreneurship and Development Institute (GEDI) in 2018 ranked Nigeria 101 in the world ranking category and 8 in the regional category, with an overall score of 19.7% (Adeosun and Shittu 2022). Sustainable energy supply is key to business growth. Authors have reported that accessibility to constant and stable electricity is crucial to the performance of SMEs and economic growth (Bank, 2013; Aderemi et al., 2021) especially as unreliable power supply can affect different aspect of business performance, causing damages to machineries, which in turn affects the overall business operation and the ability to ensure delivery times (World Bank, 2018).

In Nigeria, electricity supply system can be grouped into two: Centralised (grid-connected) and decentralised (off-grid) systems. The centralised system consists of the large-scale generation of electricity at centralised facilities such as large hydro and thermal plants, while "The decentralised electricity supply system consists of a few kilowatts to megawatt capacities such as captive diesel and gasoline generator sets as well as renewable energy technologies (such as solar home systems, streetlights and mini-grids). On the whole however, the total installed capacity of grid-based systems in Nigeria is around 13 GW. Available statistic shows that available on-grid peak generation in the country varies and hovers around 4.5 GW, a situation which has negatively affected socio-economic life of the country, due to chronic supply shortage, power inadequacy etc. According to World Bank Report (2021) 85 million Nigerians don't have access to grid electricity and this represents 43% percent of the country's population.

The implication of this includes economic backwardness, declining GDP, rising unemployment and difficulties achieving the sustainable development Goal of poverty eradication (SDG1). It has also been reported that the lack of reliable power is a significant constraint for citizens and businesses in Nigeria, resulting in annual economic losses estimated at \$26.2 billion (₦10.1 trillion) which is equivalent to about 2 percent of GDP (World Bank, 2021), and for SMEs the impact could be worst given that the principal sources of income for most SMEs are from personal savings and retained earnings, to informal external sources, comprising monetary help from family and companions, trade credit etc (Abbasi et al., 2017). In Benin City, over 60% of young people are employed in SMEs and making meaningful livelihood from small and medium businesses. Unfortunately, unreliable and unsteady power supply hypothetically remain a huge challenge to their businesses. Hence this empirical study is aimed to examine the effects of energy shortage on small businesses and how these business owners are responding to the shortage.

2. Materials and Methods

2.1. Description of Study area

The study area is Benin City, which is the capital of Edo State of Nigeria, in West Africa. Its location is within latitude 6°14'N and 6°21' N of the equator and longitude 5°35' E and 5° 44' E of the Greenwich Meridian. The area is put at 1125 square kilometres approximately. Benin City is bounded in the east by Orhionwon LGA, to the west by Ovia North East LGA, to the north by Uhumwonde LGA and to the south by Delta State. Benin City cuts across three or four Local Government Areas (LGAs) namely Oredo, Egor, Ikpoba-Okha and to some extent, the Ekosodin axis of ovia Northern East bordering the University of Benin. For the purpose of this study however, five (5) communities in Ovia northeast were selected, including Adolor quarters, 19th and 20th streets, Ekosodin, Idunmwowina and Oluku Quarters. These areas were selected owing to their proximity to university of student's environments.

2.2. Data Collection

Primary and secondary data were used for the study. Primary data was obtained for a period of 3 months (April – June) 2022, through the administration of structured questionnaires and utilization of oral interviews where necessary. Questionnaires made up of 200 structured close and open-ended questions were randomly distributed to respondents with each sampled community/quarter receiving a total of 40 questionnaire (Table 1). The questions cover socio-economic status, reliance of business on electricity grid supply, reliability and frequency of supply and impacts of electricity shortage of businesses and income levels. Businesses sampled include laundry/dry cleaning stores, photocopying/printing stores, photo studios, hair salon shop, barbing salon shop, Point of sale (POS) kiosk, beer parlor bar, soft drink spot, welding outlet and electronics electricians.

Table 1: Number of small businesses sampled

Residential quarters	Number of small businesses sampled	Number of questionnaire retrieved	Percent
Adolor quarters	40	40	100
19 th & 20 th Street	40	40	100
Ekosodin quarters	40	40	100
Idunmwowina Quarters	40	40	100
Oluku quarters	40	40	100

Data collected from the field were subjected to various statistical analyses, to generate tables, and graphs. All quantitative statistics were performed using Statistical Package for Social Science (SPSS) Version 16.0. The analysis of variance was used to test for variations in business owners' responses to whether power shortage affects their businesses.

3. Results and Discussion

The results of the respondents' socio-demographic survey (Table 2) showed that the majority of the small SMEs owner were females with 122 individuals (61.0%), while remaining 78 respondents were males (39.0%). This finding agrees with the study by Raimi et al (2016) which shows that in Nigeria, approximately 70% of people employed by SMEs are women. In another study Adetoyinbo, (2021) reported that women constitute more than 50% of the population of Nigeria, and about 30% of enterprises registered are owned by women notwithstanding the fact that women entrepreneurs face chauvinism and gender inequality as cultural barriers (Amuchie and Asotibe, 2015). Akanji, (2016) also found that the presence of women in SMEs in Nigeria contributes over 50% of the nation's gross domestic product (GDP) and a higher percentage of the total share of employment creation.

The majority of the business owners were within the age of 31 years to 50years and can be classified as youthful. This finding is a reflection of the role of SMEs in addressing youth employment in Nigeria. According to the

National Bureau of Statistics, the youth-unemployment rate in Nigeria was 34.9% in 2020, an increase from 29.7% in 2018 (Federal Ministry of Youth and Sports Development, 2021). As with most developing countries, it is difficult to achieve full employment which could be attributed to either the trade-off between achieving full employment and other macroeconomic goals or the structural failure of the economy's system or external vicissitude (Raifu, 2019), hence most young person resort to SMEs for livelihood sustenance. Of this total number of business owners, 109 (54.5%) are not married suggesting that a greater population of the study area are either unemployed graduates or young people with basic education who are not able to secure paid employment from government, married business owners with families was 33.5%, while the remaining 24 (12.0%) are either widower/widows/divorced.

Meanwhile, the educational level among farmers showed that the majority of business owners are between secondary school 67 (33.5%), and graduates 55 (27.5%). Respondents not having a formal education was 34 (17%). This finding underscores the importance of university or tertiary education in securing well-paid jobs in Nigeria. Studies have shown that job requirements have considerably risen over the last four decades, with jobs demanding more skill and more education to handle sophisticated tasks (Alekseeva et al., 2021; Atalay et al., 2020; Hershbein and Kahn, 2018). According to Autor, (2015), automation and digitalization likely push these requirements to even higher levels. A total of 112 (56.0%) of the sampled business owners reported that personal/family income was their sources of business setup. Similar observation was reported by Quartey et al., (2017).

Table 2: Socio-demographic characteristics of the respondents

Variables	Frequency (n = 200)	Percentage %
Gender		
Male	122	61
Female	78	39
Age Group		
20 years and below	18	09
21 – 30 years	32	16
31 – 40 years	51	25.5
41 – 50 years	47	23.5
51 – 60 years	36	18
61 – 70years	11	5.5
70 years and above	09	2.5
Marital Status		
Married	67	33.5
Never married	109	54.5
Divorced/widower/widow	24	12.0
Highest educational qualification		
No formal Education	34	17
Basic Edu (School Certificate)	28	14
Secondary school	67	33.5
B.Sc./HND	55	27.5
Postgraduate qualifications	16	8.0
No of years in Business/location		
<5	26	13
6-10	101	50.5
10years>	73	36.5
Sources of startup income		
Family/personal savings	112	56
Money lenders	26	13
Loan from meeting	34	17
Informal contribution (Susu)	28	14

In Table 3, it can be seen that SMEs in Benin City rely essentially on electricity grid for their operations. The importance of electricity for SMEs operations has also been reported by Sabo and Lekan (2019), Arumdeben et al., (2023), Adanlawo and Vezi-Magigaba (2021), Arumdeben et al., (2023). However, majority of the business

owners reported that electricity supply is either inconsistent, inadequate or low voltage when there is supply, while the frequency of supply is poor (Tables 4&5). In similar studies, Adewuyi and Emmanuel (2018); Muhammed et al. (2017) in their studies also reported irregular power supply as one of the major challenges confronted by SMEs in Nigeria. In another study Iwayemi (2018), reported that a total loss of output estimated at US\$ 470 billion (N71 trillion) in terms of gross domestic product (GDP) has been recorded between 1999 and 2015 in Nigerian economy due to power outages. More so, poor access to electricity supply has also been recognized as a deterrent to growth of business activities (Ugwoke et al., 2016; Doe and Asamoah, 2014). A World Bank Enterprise Survey in 2014 indicated that 35.5% of the small and medium-scale firms in Nigerians reported that electricity outages as worrisome trouble to business operations (WBES, 2014). Similarly, Adisa et al. (2014) in their study reported that fluctuations in electricity voltage and power outages affect the quality of goods and services.

Table 3: Extent of business reliance on National Electricity grid Supply in the Study Area

Business Location	Extent of reliance		
	Strongly	Moderate reliance	Zero reliance
Adolor quarters	116 (68%)	72 (36%)	12 (06%)
19 th & 20 th Street	109 (54.5%)	84 (42%)	07 (3.5%)
Ekosodin quarters	104 (52%)	69 (34.5%)	27 (13.5%)
Idunmwowina Quarters	72 (36%)	94 (47%)	34 (17%)
Oluku quarters	91 (45.5%)	68 (34%)	41 (20.5%)
Mean %	49.2	38.9	12.7

Table 4: Reliability of Electricity Grid Supply in the Study Area

Business Location	Reliability of Supply				
	Supply is Stable (18-24hrs supply)	Inconsistent (On & Off)	Supply is inadequate	Low voltage	Available in days interval
Adolor quarters	0 (0%)	97 (48.5%)	62 (31%)	29 (14.5%)	12 (06%)
19 th & 20 th Street	0 (0%)	102 (51%)	69 (34.5%)	18 (09%)	11 (5.5%)
Ekosodin quarters	0 (0%)	92 (46%)	72 (36%)	31 (15.5%)	05 (2.5%)
Idunmwowina Quarters	0 (0%)	104 (54%)	67 (33.5%)	22 (11%)	07 (3.5%)
Oluku quarters	0(0%)	94 (47)	84 (42%)	16 (08%)	05 (03%)
Mean %	0.0	49.3	35.4	11.6	4.4

Table 5: Frequency of Electricity Grid Supply in the Study Area (hr/day)

Business Location	Frequency of supply			
	<3hrs/day	4-5hrs/day	6-10hrs/day	Available at Night only
Adolor Quarters	36 (18%)	84 (42%)	72 (36%)	08 (0.4%)
19 th & 20 th Street	44 (22%)	86 (43%)	70 (35%)	0 (0%)
Ekosodin quarters	41 (20.5%)	87 (43.5%)	69 (34.5%)	03 (1.5%)
Idunmwowina Quarters	75 (37.5%)	42 (21%)	26 (13%)	57 (28.5%)
Oluku quarters	33 (16.5%)	97 (48.5%)	48 (24%)	22 (11%)
Mean %	22.9	39.6	28.5	09

Respondent views of the impacts of electricity shortage are presented in Tables 6 and 7. Low patronage of clients and income decline were mostly reported. This is true as according to Muhammed et al. (2017) electricity supply determines financial performance of the SMEs, especially, manufacturing sector. The above finding also agrees with the study by Scott et al., (2014), that electricity outages could adversely impact the profitability of SMEs. Nuredeen et al. (2018) also reported that power outages could have affected SMEs expansion and led to untimely liquidation. According to Abotsi (2016), electricity outages diminish production efficiency in most developing nations. Adewuyi and Emmanuel, (2018) found that over the years, electricity outages have continued to frustrate many business activities indifferent parts of Nigeria. Olatunji (2019) has also reported that electricity outages have led to migration of many business organizations from Nigeria to different nations. According to a World Bank prolonged, power outages can have debilitating impacts on the manufacturing process by halting productivity,

causing damages to machineries, which in turn affects the overall business operation and the ability to ensure delivery times (World Bank, 2018; Chad, 2018).

Table 6: Effects of Energy Poverty on Business in the Study Area

Business Location	Level of Effect					
	Low patronage	Work shutdown	Income decline	Product storage challenge	Extra expenses on alternative power supply	Extra expenses on purchasing ice blocks
Adolor quarters	56 (28%)	24 (12%)	52 (26%)	18 (09%)	40 (20%)	10 (05%)
19 th & 20 th Street	44 (22%)	12 (6%)	59 (29.5%)	26 (13%)	55 (27.5%)	04 (02%)
Ekosodin quarters	36 (18%)	08 (04%)	69 (34.5%)	42 (21%)	34 (17%)	11 (5.5%)
Idunmwowina	27 (13.5%)	04 (02%)	72 (36%)	18 (09%)	62 (31%)	17 (8.5%)
Quarters						
Oluku quarters	12 (06%)	02 (01%)	101 (50.5%)	12 (06%)	57 (28.5%)	16 (0.8%)
Mean %	17.5	05	35.3	11.6	24.8	5.8

Table 7: Impact of Energy Poverty on Income Level in the Study Area (Weekly)

Business Location	Impact in Naira (₦)				
	< ₦20,000	₦21,000 – 40,000	₦41,000 – 60,000	₦61,000 – 80,000	₦80,000 >
Adolor quarters	52 (26%)	67 (33.5%)	47 (23.5%)	22 (11%)	12 (06%)
19 th & 20 th Street	54 (27%)	56 (28%)	52 (26%)	31 (15.5%)	07 (3.5%)
Ekosodin quarters	36 (18%)	74 (37%)	47 (23.5%)	25 (12.5%)	18 (09%)
Idunmwowina	44 (22%)	66 (33%)	55 (27.5%)	32 (16%)	03 (1.5%)
Quarters					
Oluku quarters	34 (17%)	78 (39%)	49 (24.5%)	28 (14%)	11 (5.5%)
Mean %	22	34.1	25	13.8	5.8

It was hypothesized that there is no significant difference among business owners in terms of loss due to power/electricity inadequacy. To test the hypothesis, an ANOVA test was conducted; the ANOVA test yielded an F value of 16.4 (Table 8). Thus, since the calculated F-value of 16.4 is greater than the critical F value of 2.6, so we rejected our hypothesis. Therefore, there is some significant difference among business owners in terms of loss due to power/electricity inadequacy.

Table 8: Analysis of variance of variation in the impacts of power shortage on businesses

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	13878.27	5	2775.653	16.43857	0.00004	2.620654
Within Groups	4052.4	24	168.85			
Total	17930.67	29				

In Table 9, alternative to electricity grid as reported by business owners are reported. The fact that majority of the business owners rely on generating sets also known as gensets as alternative to electricity grid supply. Babajide and Brito (2021), also reported that lack of reliable electricity in much of Nigeria and sub-Saharan Africa has driven the need for self-generation and consumption of electricity. A similar study found that even in urban Nigeria, 6.3% of electricity-accessing households rely primarily on generators. The study further showed that primary reliance on generators is highest in the south-south (24.10%) and the south-east (20.70%) regions where generators is central to about a quarter and a fifth of electricity-accessing households (Odeyale et al., 2022). In another study Ibadode, (2016) found that 12.4% of households in south-south Nigeria count on generators as secondary source of electricity. Adeleru-Balogun, (2019) asserted that there are between 22 and 60 million small, domestic use generators in Nigeria. Similarly, Giwa, et al., (2019) asserted that there are over 50 million units of

generating sets in Nigeria as a result of power outage. Nigeria is already one of the largest importers of diesel generators in the world and is estimated to spend \$250 million annually to import gensets and their spare parts (Babajide and Brito, 2021). However, diesel generators carry health and environmental risks because they emit fine particulate matter (PM), including black carbon, which is derived from the incomplete combustion of diesel (World Bank, 2014). According to a World Bank report that inventoried diesel power generation in Nigeria and its emission of various types of pollutants, particulate matter can lead to respiratory and cardiopulmonary disease which in turn can result in more hospital visits and a higher risk of premature death (World, 2014). The report further notes that the residential and commercial sectors of Nigeria are significant users of diesel generators for electricity generation.

Table 9: Practising alternative to electricity supply shortage in the study area

Business Location	Impact in Naira (₦)			
	Generating set	Solar	Buying of ice blocks	Take clients work home
Adolor quarters	74 (37%)	56 (28%)	56 (28%)	14 (07%)
19 th & 20 th Street	88 (44%)	47 (23.5%)	52 (26%)	13 (6.5%)
Ekosodin quarters	102 (51%)	36 (18%)	44 (22%)	18 (09%)
Idunmwowina Quarters	106 (53%)	27 (13.5%)	47 (23.5%)	20 (10%)
Oluku quarters	112 (56%)	18 (09%)	51 (25.5%)	19 (9.5%)

4. Conclusion and Recommendations

SMEs are considered a veritable tool for economic growth and development especially as such businesses play a key role in promoting prosperity by creating new jobs and increasing the country's economic prosperity. In Nigeria, over 70% of the country's population is engaged in small and medium enterprises which require minimum start-up capital. Unfortunately, electricity supply remains a key challenge to economic development, affecting over 60% of SMEs operations and resulting in economic backwardness, declining GDP, rising unemployment and difficulties achieving key sustainable development goals of poverty eradication (SDG1). The present study hence aimed to examine the effects of electricity grid inadequacy on the operations of small businesses in select quarters in Benn City, Edo state. A total of ten (10) small businesses were sampled using questionnaire method across ten (10) quarters in the study area. The study found that majority of business owners (49.2%) rely on electricity grid supply for their operations. On whether electricity grid supply is reliable, 49.3% reported that supply is inconsistent (on and off), while 35.4% reported that supply is inadequate for their businesses. A total of 38.6% of the sampled respondents reported that electricity grid supply is only available for a period of 4-5hr/day in their quarters, 28.5% reported 6-10hr/day in other quarters, while 22.9% reported that supply is only available for less than 3hrs/day in their quarters.

In terms of effect of poor supply on business operations, income decline ranked highest (35.3%), followed by extra expenses by business owners on alternative electricity supply operations especially power generating sets popularly known as gen set which constitute pollution. There need for the governments to expand and modify the nation's financing policies for SMEs to improve their conditions for accessing loans as well as initiate result-oriented financing schemes for SMEs and entrepreneurs. Such policies and initiatives may help business owners access loans to purchase alternative electricity supply arrangements while at the same time having the capacity to expand their operations. There is a need for government to intervene in the energy sector with the view to making electricity grid supply available and affordable.

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The Effects of Organizational Communication, Quality of Work Life, and Work Environment on Improving Employee Performance

Shinta Oktafien¹, Anton Budi Santoso², Rima Rahmayanti³, Mariah Rabiatul Qibtiyah⁴

^{1,2,3,4} Faculty of Economics & Business, Widyatama University, Bandung, Indonesia

Correspondence: Shinta Oktafien, Faculty of Economics & Business, Widyatama University, Bandung, Indonesia. E-mail: shinta.oktafien@widyatama.ac.id

Abstract

Human resources have a very important role in efforts to achieve the goals of an organization or company, both in small and large organizations or companies. The purpose of this study is to determine the effect of effective organizational communication, quality of work life, and work environment on improving employee performance at PT. Astra Honda Motor Sampurna. The population in this study were all employees working in this company with the number of samples taken as many as the population of 32 people. Thus, the sampling technique used in this study was in the form of saturated sampling (census). Meanwhile, the research method used in this study is included in quantitative research, with data processing and analysis techniques in the form of multiple regression analysis. A brief conclusion from the results of this study shows that partially the quality of work life and work environment do not show a significant effect on employee performance, while organizational communication has a significant effect on employee performance. Meanwhile, organizational communication, quality of work life, and work environment simultaneously have a significant effect on employee performance.

Keywords: Organizational Communication, Quality of Work Life, Work Environment, Employee Performance

1. Introduction

It is important to know that human resources have a very important role in improving the quality of work that is increasingly more competitive, high quality, and able to adapt to all the challenges of environmental change faced by an organization or company. The important role of human resources has proven that their roles and functions cannot be replaced by other resources. Even though an organization or company has very large capital to increase the rotation of its business wheels, without human resources capable of driving it, in addition to being able to work optimally, the business run by the organization or company will not run well. Therefore, it is necessary to have good and professional management of the human resources owned by an organization or company, so that when working, each person is able to show the best possible work performance aimed at achieving organizational goals effectively and efficiently.

PT. Astra Honda Motor Sampurna is a company engaged in the sales of spare parts and services for Honda brand motorbikes with a total of 32 employees working. This company was founded on April 25 2003 located on Jl. Surapati No. 185, Sukaluyu, Bandung City. The vision of this company is to make the company a market leader and motorbike service provider in Indonesia and world-class, by realizing consumers' dreams and contributing to Indonesian society. In order to achieve this vision, companies need employees who are able to work optimally because employees have a very important role in maintaining the sustainability of the business run by a company.

Table 1: Target and Realization of PT Employee Performance. Astra Honda Motor Sampurna Period 2018 to. 2022

No	Performance Indicators	Target (%)	Realization (%)				
			2018	2019	2020	2021	2022
1	Employee Attendance	100	92	91	85	88	96
2	Making Purchase and Inventory Reports	100	100	100	67	58	100
3	Development of Mechanical Quality (Coaching)	100	100	75	0	0	100
4	Acceptance of Services	100	94	85	72	77	85
5	Spare Parts Sales (Spare Part)	100	93	87	71	82	91

Source: Company Performance Report, 2023

The data shown in table 1 shows that the actual performance achievements of employees working for this company still show work results that are not very satisfactory, even though in 2018 and 2020 there are still several work indicators that have been able to achieve the predetermined work target percentage. However, over all the work results shown by employees working at this company are still considered not very good, there is even one work indicator that in 2020 and 2021, namely coaching for mechanical quality, did not reach the work target percentage at all which has been previously determined.

Defined by Sedarmayanti (2013) that employee performance as the result of work in terms of quality and quantity achieved by an employee in carrying out his duties in accordance with the responsibilities given to him. Several dimensions and indicators are used as measures in assessing employee work results at work, including (Robbins & Judge, 2015): 1) Work quality, namely measuring work results based on employee perceptions of the quality of work produced, as well as perfection in carrying out tasks which is carried out using the employee's skills and abilities, with several indicators in the form of the employee's level of neatness and thoroughness in carrying out the task; 2) Quantity, namely the amount produced which is often expressed in terms such as the number of units or the number of activity cycles completed, with several indicators in the form of the employee's level of achievement in completing the work and the level of work volume with the employee's abilities; 3) Punctuality, namely the level of activity that can be completed at the beginning of the stated time, as well as maximizing the time available to carry out other activities, with several indicators in the form of the level of employees completing their work on time and efficiently, as well as the level of employees carrying out their tasks quickly; 4) Effectiveness, namely the level of use of organizational resources (energy, money, technology and raw materials) which can be maximized with the aim of increasing the results of each unit in the use of resources, with the indicator being the level of employees using the right facilities and infrastructure in carrying out work ; and 5) Independence, namely the level of an employee who is able to carry out his work function without asking for guidance from a supervisor or asking for supervisors to intervene in the work, with several indicators in the form of the employee's level of courage to bear the risks of work, and the level of employee completing work without the help of colleagues.

It should be noted that one of the factors that is thought to be the cause of an increase or decrease in work performance or employee work results at work, among them is the organizational communication factor. Often, if communication between superiors and subordinates does not go well, for example employees who do not understand their assignments correctly, or misinterpret orders given by their superiors or superiors, can result in the orders given not being carried out properly, thus having an impact on employee work performance decreases. Increasingly disharmonious working relationships between fellow employees during work, as a result of very poor communication patterns which give rise to frequent conflicts between superiors and subordinates or between employees, can have an impact on employee performance that is increasingly poor, even impacting also bad for the company's overall performance.

Several previous research results show that organizational communication can have a positive and significant effect on employee performance. This is proven through a study from Ernika, D. (2016) which states that good communication can be the right means for improving employee performance. This means that if the exchange of information can be carried out very well, completely and smoothly, it is hoped that employees can carry out their duties and responsibilities correctly and this will have a good impact on employee performance. Likewise with the opinion of Triana, A, et al. (2016) who concluded that organizational communication has a significant effect on employee performance. This means that if organizational communication runs very well and effectively, employee performance will increase. However, effective communication does not always have an impact on better employee performance. This is proven by a study by Syukur, A., Supriyono, E., & Suparwati, Y. K. (2019) which concluded that by not talking more with co-workers or other people, employees will become more focused at work, resulting in productivity work is increasing.

Mulyana, D (2011) defines organizational communication as the display and interpretation of messages between communication units that are part of a particular organization, in other words consisting of communication units in a hierarchical relationship with each other and functioning in an environment. Several indicators of organizational communication effectiveness include (A.W. Suranto, 2011): 1) Comprehension, namely the ability to understand the message carefully as intended by the communicator; 2) Pleasure, where the purpose of communication is not just to transact messages, but is also intended to interact with each other in a pleasant way to foster human relationships; 3) Influence on attitude, namely the ability of a communicant to change his attitude according to the message he receives; 4) Improved relations, where an effective communication process can inadvertently increase the level of international relations; and 5) Action, where both parties communicating take action in accordance with the message being communicated.

Quality of work life has a very important function in efforts to improve employee performance. If someone has, or is able to achieve a high quality of work life, then the performance shown by that person can become increasingly better and also have an impact on achieving the organizational goals that have been set. As stated by Wibowo (2007), improving the quality of workers' lives has a crucial role in efforts to increase work productivity. If an organization is able to improve working environment conditions that make employees feel comfortable at work, then employees will automatically work with higher levels of productivity because employees are able to devote all their thoughts to showing their best work performance while working, and working to achieve goals. organization. However, sometimes a working atmosphere that feels safe and comfortable can have an impact on better employee performance. This is demonstrated by the opinion of Asharini, Hardyastuti, and Irham (2018) who state that quality of work life (QWL) does not have a significant effect on improving employee performance.

Defined by Bernardin & Russell (1993), that the quality of work life is the level of an individual (employee) in meeting his or her personal needs (a need for freedom) as long as the individual is still employed. The opinion expressed by Luthans (2006) states that the quality of work life is the impact of human and organizational effectiveness combined with an emphasis on problem solving and decision making. In this way, it is said that the quality of work life is an employee's perception of the well-being and work atmosphere in the workplace, and refers to how effectively the work environment can meet the employee's needs. Several indicators that can be used as a measure in assessing the quality of a person's work life include (Bernadin & Russell, 1993): 1) Growth and Development, namely the opportunity for employees to develop all their skills and performance in the challenges of carrying out a job within the organization; 2) Participation, namely the opportunity given to employees by the

organization to make decisions and be responsible for their work; 3) Physical Environment, namely the employee's feeling of comfort in the workplace environment which is able to increase work productivity; 4) Supervision, namely a good relationship between the leader and his employees, as well as the ability of a leader to work in a team and provide clear direction regarding the work that must be done by his employees, so that the work can be completed well; 5) Pay and Benefits, namely the opportunity for employees to receive wages/salaries in accordance with their workload; 6) Social Relevance, namely good relationships with colleagues in completing work and other aspects of life at work; and 7) Workplace Integration, namely good relationships with colleagues in forming a work team to complete a job.

Another factor that is thought to have an influence on improving employee performance is the work environment factor. If an organization is able to create a positive work environment, employees tend to be able to show better performance results while working. On the other hand, if an organization is unable to create and maintain a good work environment, it will be difficult for employees to show their best performance at work. Often, by creating a work environment that is able to provide recognition for work achievements, as well as challenges in work and employee career development, employee work motivation will increase, which will also have an impact on improving employee performance. Likewise, if the work environment created is able to provide a feeling of security and comfort, and pays attention to work-life balance for employees, then the level of employee welfare will be higher, which will lead to increased work productivity. As stated by Badrianto, Y., & Ekhsan, M. (2020) who stated that the work environment has a positive and significant effect on employee performance. Likewise, the opinion of Rorong, S. V. (2016) concluded that the physical work environment has a significant effect on improving employee performance. In his study, it was stated that room temperature and humidity can be an important element that contributes to improving employee performance. In addition, several other elements of the physical work environment play an important role in efforts to increase employee work productivity, including good work space lighting, the absence of loud noises, a clean, safe and comfortable work space. However, the work environment does not always have a positive effect on improving employee performance. This is demonstrated through a study from Bahri, S. (2019) which states that the work environment has an insignificant effect on employee performance.

Affandi (2018) defines the work environment as everything that is around employees and can influence them in carrying out the tasks assigned to them, for example by having air conditioner (AC), adequate lighting, and so on. Several indicators that can be used as benchmarks in assessing the condition of the work environment in an organization include (Nitisemito, 2014): 1) The physical work environment which includes factors such as: a) Lighting in the workplace, where workplace lighting is good. sufficient to assist the organization's success in carrying out its operational activities; b) Air circulation, where sufficient air exchange is required in each work space to help increase the physical freshness of employees while working; c) Layout, where each employee should have a comfortable work space to complete their work well; d) Facilities, where the availability of complete facilities can be a supporting factor for employees in carrying out their daily work activities; e) Security, where the sense of security felt by the employee can help the employee to remain enthusiastic at work and demonstrate the best work performance; and 2) Non-physical work environment which includes several factors as follows: a) Relationships with co-workers, where each employee is able to work well together among groups which results in their work being completed more quickly and easily; b) Work atmosphere, namely the conditions around employees who are doing work which can influence the implementation of the work itself; c) Attention and support from superiors, namely the extent to which employees feel that superiors often provide direction, confidence, attention and respect for them; d) Work responsibility, namely the extent to which employees feel that their work can understand and be responsible for their actions; e) Relationship between superiors and subordinates, where good and harmonious relationships are created between leaders and their members, employee performance will increase.

Based on this explanation, the author became interested in conducting research with the following title: "The Effects of Organizational Communication, Quality of Work Life, and Work Environment on Improving Employee Performance."

2. Method

Judging from the relationship between variables, this research is included in causal associative research which aims to find out and analyze the relationship between one variable and another variable, so that it can be seen how one variable can influence or be influenced by other variables (Umar, 2015). Meanwhile, if you look at the data used, this research is included in quantitative research, namely research based on data in the form of numbers and numbers (Suliyanto, 2005). The aim of this research is to find out whether organizational communication, quality of work life, and a conducive work environment can have a significant effect on improving employee performance at PT. Astra Honda Motor Sampurna.

The main variables in this research are the variables Organizational Communication (X1), Quality of Work Life (X2), and Work Environment (X3) which act as the independent variables, as well as the Employee Performance variable (Y), which acts as the dependent variable. It is stated that population is a generalized area consisting of objects or subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn (Sugiyono, 2019). Meanwhile, it is stated that the sample is part of the population that has certain characteristics or conditions that will be studied (Riduwan, 2007). In this research, the population and sample are all employees who work at PT. Astra Honda Motor Sampurna, totaling 32 people. In connection with the number of samples taken having the same size as the population, the sampling technique used in this research is the census method or saturated sampling which, if defined, is the sampling technique used if all members of the population are used as samples.

Judging from the source, the data required in this research is divided into two sources, including: 1) Primary data sources, namely data sources that directly provide data to data collectors, or data obtained directly from the original source, where In this research, primary data was obtained through interviews and distributing questionnaires distributed to employees who work at PT. Astra Honda Motor Sampurna as the respondent; 2) Secondary data sources, namely data sources that indirectly provide data to data collectors, or data obtained indirectly from the original source, and are used as supporting data for research results obtained through library or literature studies. It should also be noted that the data collection techniques used in this research were carried out in various ways, including: 1) Literature study, namely a theoretical study used to collect relevant data that is in accordance with the research topic, whether the data is sourced. from books, news, national and international journal articles, as well as other trusted sources; 2) Questionnaire, which is a method of collecting data which is carried out by distributing a set of questions or written statements which are distributed to respondents for them to answer; 3) Interview, which is a method of collecting data which is carried out when the researcher wishes to carry out a preliminary study to find the problem under study, and also aims to find out everything from the respondent in more depth with a small number of respondents. In this research, interviews were conducted by asking directly an employee who holds the position of service advisor in this company with the aim of obtaining as much data or information as possible related to this research problem; 4) Observation, namely a method of collecting data whose process is aimed at understanding, knowing and exploring an object which involves direct monitoring of the object being studied.

Meanwhile, for the data processing and analysis techniques used in this research, multiple regression analysis was carried out, with hypothesis testing (t and F tests) calculated using the SPSS version 23.0 program.

3. Results

The following is a table showing the results of simultaneous hypothesis testing:

Table 2: Hypothesis Testing (F Test)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3629.342	3	1209.781	11.598	.000 ^b
	Residual	2920.658	28	104.309		
	Total	6550.000	31			

a. Dependent Variable: Employee Performance

b. Predictors: (Constant), Work Environment, Quality of Work Life, Organizational Communication

Source: Processed data, 2024

Based on the data shown in table 2, it is known that if the r value is not greater than the α level used, namely 0.05, or $0.000 < 0.05$, then H_0 is rejected, which means that organizational communication and the quality of work life have a significant effect on employee performance.

Table 3: Multiple Regression of the Effect of Organizational Communication, Quality of Work Life and Work Environment on Increasing Employee Performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	37.578	24.437		1.538	.135
	Communication	1.193	.230	.662	5.193	.000
	Quality	.186	.099	.244	1.881	.070
	Environment	-.265	.219	-.157	-1.212	.235

a. Dependent Variable: Kinerja

Source: Processed data, 2024

The data shows that:

- A constant of 37,578 means that if changes occur in Organizational Communication, Quality of Work Life and Work Environment, the value of Employee Performance is 37,578.
- Organizational Communication (Variable X1) has a positive value of 1,193, which means that higher Organizational Communication (X1) can increase the value of Employee Performance by 1.193.
- Quality of Work Life (Variable X2) has a positive value of 0.186, which means that a higher Quality of Work Life (X2) can increase the value of Employee Performance by 0.186.
- Work Environment (Variable X3) has a negative value of 0.265, which means that a higher Work Environment (X3) can reduce the value of Employee Performance by 0.265.

Based on the data shown in table 3, it is known that the t_{count} value (5.193) has a value with a number greater than the t_{table} value (2.042), which means that H_0 is rejected, so that the Organizational Communication variable (X1) has a significant influence on the Employee Performance variable (Y).

Based on the data shown in table 3, it is known that the t_{count} value (1.881) has a smaller value compared to the t_{table} value (2.042), which means that H_0 is accepted, so that the Quality of Work Life variable (X2) shows an insignificant influence on the Performance variable. Employee (Y).

Based on the data shown in table 3, it is known that the t_{count} value (-1.212) has a value with a smaller number than the t_{table} value (2.042), which means that H_0 is accepted, so that the Work Environment variable (X3) shows an insignificant influence on the variable Employee Performance (Y).

Table 4: Coefficient of Determination (R^2) of the Effect of Organizational Communication, Quality of Work Life, and Work Environment on Employee Performance

Model Summary ^b				
Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.744 ^a	.554	.506	10.213

a. Predictors: (Constant), X3, X2, X1

b. Dependent Variable: Y

Source: Processed data, 2024

The measurement of the coefficient of determination (R^2) is defined as a measurement that aims to determine the extent to which a research model can explain variations in the independent variables with values ranging between 0 and 1.

The visible data shows that the coefficient of determination (adjusted R^2) of the variables studied is 0.554, which means that a 55% increase in employee performance can be determined by how effective the communication between superiors and subordinates is, the ability of workers to meet their needs through work. what they do, as well as how conducive the work environment is felt by employees. Therefore, the influence shown by the three independent variables, namely the variables Organizational Communication (X1), Quality of Work Life (X2), and Work Environment (X3), on the dependent variable in the form of Employee Performance (Y) is 55%, while the remaining 45% is determined by other factors that are not used as variables that are thought to influence the dependent variable.

4. Discussion

4.1. The Influence of Organizational Communication on Employee Performance

The research results show that the effectiveness of communication in an organization can be one of the factors that influences the increasing work performance of employees at work. This means that as communication becomes more effective between fellow employees while working, the better the work results demonstrated by these employees in carrying out their duties and functions in accordance with their respective positions. Therefore, without effective communication, it is difficult for employees to show their best performance at work, which also results in the overall organizational goals not being achieved. As expressed by Kuswarno, E. (2001), the main problems of the organizational communication process that determine organizational effectiveness include: 1) message (information) processing process, where problems often arise if there are differences in meaning between the sender of the message and message recipients, as well as excessive information that can give rise to negative reactions from communication participants; and 2) organizational communication style. Meanwhile, the opinion expressed by Nurrohim, H., & Anatan, L. (2009) states that several things need to be considered by a communicator in creating effective communication, including the ability to identify targets who are recipients of messages, determining communication goals. designing messages, selecting media and message sources, and collecting feedback. Similar to the research results expressed by Islami, A. N., Palupi, M. F. T., & Romadhan, M. I. (2021) which concluded that if organizational communication increases, employee performance will also increase. A similar opinion was also expressed by Riono, S. B., Syaifulloh, M., & Utami, S. N. (2020) through his study which states that high or good organizational communication will be followed by increased employee performance.

4.2. The Influence of Quality of Work Life on Employee Performance

The research results show that the quality of work life does not always play an important role in efforts to improve employee performance. This shows that improvements in the quality of work life are not always accompanied by better work results shown by employees during work. As stated by Asrini, Hardyastuti, and Irham (2018) in their study, quality of work life (QWL) does not have a significant effect on increasing employee performance, either directly or indirectly through other variables, such as organizational commitment. In this way, it seems that there are still other exogenous factors or variables that have a greater influence on improving employee performance. However, several other studies actually show that there is a significant influence of the quality of work life on increasing employee performance, either directly or indirectly through other intermediary variables. One of them is shown by the results of a study from Sari, Bendesa & Antara (2019) which states that quality of work life (QWL) directly has a positive and significant influence on employee performance, or indirectly through the intermediary variables job satisfaction and work motivation. Another opinion was expressed by Setyaningrum and Ekhsan (2021) who stated that there needs to be a variable that can mediate the relationship between quality of work life (QWL) and employee performance, namely job satisfaction.

4.3. The Influence of the Work Environment on Employee Performance

The research results show that creating a conducive work environment in an organization is not always the most crucial factor that can influence improving employee performance. This means that as the working environment is getting better for employees while working, it does not necessarily mean that employee performance results will

be better than before. The results of this research seem to have a different perspective from several previous research results which actually show that there is a significant influence of the work environment on improving employee performance. As the results of the study shown by Joseph (2016) concluded that the physical and non-physical work environment has a significant influence on increasing employee work productivity, both partially and simultaneously. A similar conclusion was also shown by Setiyanto & Natalia (2017) who stated that the physical and non-physical work environment had a positive and significant effect on the level of employee work productivity. However, several other studies have similar results to this research, including the opinion expressed by Hanafi, B. D., & Yohana, C. (2017) which states that the work environment does not have a significant influence on employee performance.

5. Conclusion

Based on the results of the research and discussion, it is concluded that: 1) Organizational communication has a significant effect on employee performance, which means that as the communication between fellow members in an organization becomes more effective, the better the performance shown by its members will be. while working; 2) The quality of work life does not have a significant effect on improving employee performance, which means that creating an increasingly harmonious work atmosphere does not always have an impact on increasing employee performance; 3) The work environment does not have a significant effect on improving employee performance, which means that as the work environment becomes more conducive, it does not mean that the employee's performance is getting better. 4) Organizational communication, quality of work life and work environment have a significant effect on employee performance.

It should be realized that this research still has several limitations in its implementation and presentation. Therefore, so that in the future this research can be carried out even better, it is necessary to add several other variables which are thought to have an influence on the work results shown by employees during work, such as leadership, work motivation, workload, work stress, program effectiveness. training and development, job placement, etc., in addition to needing to involve several other similar companies as units of analysis, so that the number of respondents involved becomes increasingly large.

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How Do Venture Capital Firms in Southeast Asia Make Investment Decisions on Early-Stage Start-Ups

Faldi Haris¹, Raden Aswin Rahadi²

¹ School of Business and Management, Institut Teknologi Bandung. Email: Faldi_haris@sbm-itb.ac.id

² School of Business and Management, Institut Teknologi Bandung. Email: aswin.rahadi@sbm-itb.ac.id

Abstract

VC investment has undergone a substantial transition, particularly in emerging countries, where there is a growing entrepreneurial culture. Southeast Asia (SEA) has emerged as an image of trust due to its remarkable accomplishments in venture capital funding. Notwithstanding, the VC success rate is quite low, with up to 75 percent of venture-backed businesses failing to return cash to their investors and 30 to 40 percent of those 75 percent liquidating their assets, resulting in their investors losing their entire investment (Ghosh, 2012). In light of this context, this study sets out to investigate the behavior of venture capital firms in Southeast Asia and the complex decision-making processes involved. This research aims to enhance the success rate of VC firms and contribute to the advancement of VC literature by precisely identifying the relevant parameter. This study seeks to analyze the complex landscape of venture capital activities in a highly dynamic entrepreneurial ecosystem, using the complete framework created by Gompers et al. (2023). A case study, a widely recognized method in exploratory research, is used as the primary methodology to reveal novel themes and insights obtained from respondents in venture capital firms. Using a semi-structured interview, this study implies that VC fund structure and strategy, start-up screening criteria, start-up valuation, exit, and risk management have a significant effect on determining SEA VC firm investment decisions. This study is one of the first efforts to utilize Gompers et al.'s (2023) framework in the specific setting of Southeast Asia. This study contributes to the current research on venture capital decision-making by providing innovative measurement parameters, with a particular emphasis on the notion of "runway." These features, which relate to a startup's expenditure rate and its long-term viability offer a broader understanding of the financial factors that impact investments made by SEA VC companies.

Keywords: Venture Capital, Alternative Investment, Start-Up, Emerging Economies

1. Introduction

1.1 Problem Statement

Venture capital (VC) funding has grown exponentially, particularly in emerging countries, and start-up fundraising in Southeast Asia outperformed all other emerging markets by raising US\$8.2 billion in 2020, according to Rudnik and Zhvirbo (2021). In 2021, it continued to perform well, raising US\$6 billion in venture capitalist (VC) funding in the first quarter alone, setting a record year.

Based on the Startup Ranking report, in 2022, Indonesia has 2,346 startups throughout the country. This number places Indonesia as the leading country in Southeast Asia. This number even exceeds Singapore's record of 1,013

startups. The Philippines and Malaysia are in third and fourth place with a total of 308 startups and 307 startups, respectively. Then, Vietnam and Thailand followed with a total of 173 startups and 147 startups, respectively.

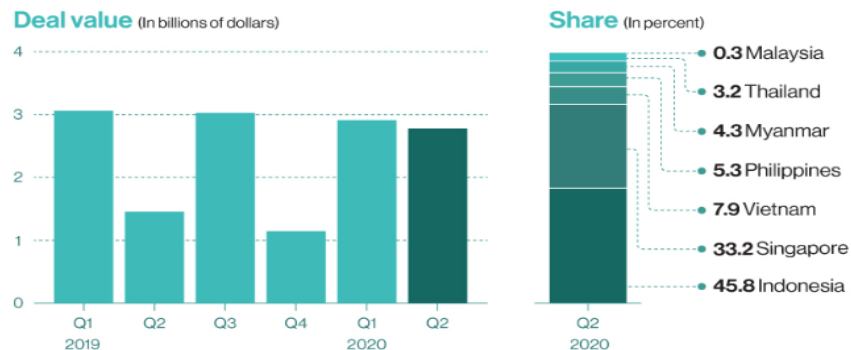


Figure 1: Start-up Fundraising Deals in Southeast Asia (Rudnik and Zhvirbo, 2021)

This paper is an extended version of the Gompers et al. (2023) framework. To gain a deeper understanding of VC firm investment decisions, this study has research objectives, which are to determine measurement parameters of venture capital (VC) firms in evaluating investment decisions in emerging countries, particularly Indonesia.

This research assumes that the participants will provide accurate and reliable information regarding VC investment evaluation in Indonesia. However, we cannot entirely rule out potential response bias and incomplete disclosure. Furthermore, the study focuses primarily on the perspective of VC firms and may not capture the viewpoints of other stakeholders, such as entrepreneurs, government bodies, or limited partners. Additionally, as with any research, limitations in generalizing the findings to a larger population may exist due to the specific context and sample size.

1.2 Research Objectives

The objective of this research is to understand the behavior of venture capital firms in evaluating investment decisions. To gain insight into the decision-making process of venture capital firms, this study outlines the primary research questions as follows:

- What are the parameters that influence VC firms in SEA to make investment decisions?

1.3 Summary of Research Framework

This study will adhere to a well-organized framework consisting of the following components: introduction, relevant literature, research design, findings and analysis, conclusion, limitations, and suggestions for future research. The literature review will include a comprehensive summary of the current research on the appraisal of venture capital investments and the criteria that are considered by venture capital firms. The study design section will detail the establishment of this research, including the framework, methodology, and a comprehensive profile of the respondents. The findings and analysis section will summarize the results obtained from the interviews, followed by an analysis that examines the findings, compares them to the current literature, and resolves gaps in the study. The conclusion section will include an informative summary of the main findings, along with a comparison to the current literature and a modification of the decision model. Following that, we highlight the limitations and potential directions for further study.

2. Related Literature

According to Metrick and Yasuda (2011) and the European Venture Capital and Private Equity Association (2004), private equity comprises a significant portion of the alternative investment market. Private equity is a type of unregistered equity, and equity-linked instruments issued to financial buyers by private and public firms or partnerships (Vanacker & Manigart, 2010). It comprises venture capital, buyout financing, and restructuring

capital. On the other hand, venture capital, a subcategory of private equity, comprises equity or equity-linked investments in startups, early development, and expansion.

Gompers et al. (2023) focus on 8 indicators, which are: deal sourcing; investment selection; valuation; deal structure; post-investment value-added; exits; internal firm organization; and relationships with limited partners. Deal selection is the most critical indicator. Particularly important in deal selection and understanding ultimate deal outcomes is the preeminence of the team in the minds of the VCs. When it comes to investment, the management team holds greater importance than business factors. In terms of valuation, the exit plan consideration ranks higher than the start-up company valuation itself. VCs rarely use financial theories such as net present value (NPV) or discounted cash flow (DCF) techniques. The most popular methods are cash-on-cash multiples (63% of the sample) and internal rate of return (IRR) (42% of the sample). Only 22% of VC investors use NPV methods. In conclusion, VC firms appear to make decisions in a way that is inconsistent with the predictions and recommendations of finance theory. Traditional valuation methods, like DCF, are ineffective for start-ups due to uncertainty and a lack of data. Reinfeld (2018) recommends alternative methods, such as the Venture Capital and Real Options methods, that account for these challenges and emphasize qualitative factors. Other researchers, Subroto and Sukarno (2019), use the Demodaran and First Chicago methods to value a corporate venture backed by a parent company. However, it does not address firms with other funding structures, such as those supported by limited partners or institutional investors.

Related to exit parameter, Bayar and Chemmanur (2010) studied the correlation between IPOs versus acquisitions and the valuation premium puzzle. They said a private firm is run by an entrepreneur and VC who desire to exit partially from the firm, so there are two sets of concerns regarding their exits. There are three factors driving private firm exits, which are: competition in the product market, differences in asymmetry characterizing the two-exit mechanism, and the private benefit of control accruing post-exit. The product market is the key factor driving their exit decisions. Smith et al. (2010) have different considerations for exit criteria. They mainly talked about venture capital fund performance and exit effects. This study establishes a significant relationship between performance, IPO, and M&A outcomes and suggests that fund IRR, or the total value of paid-in capital, influences fund outcomes.

Sahlman (1990) referred to the process of VCs sourcing potential investments as generating deal flow, while Kaplan and Stromberg (2004) selected venture capital investments. Their study considers, among other things, market attractiveness, strategy, technology, product or service, customer adoption, competition, deal terms, and the quality and experience of the management team. Kaplan et al.'s (2009) study identifies more consistent factors over the course of a successful VC investment. The meaning of "Jockey" They provide details about the entrepreneurial team and outline the strategy and business model. Gompers et al. (2010) identify past entrepreneurial success as a significant factor in attracting potential investments.

In Indonesia, Widyasthana et al. (2016) focused on CVC (corporate Venture Capital) investment selection. Geographic location, market conditions, country circumstances, investment timing and stages, intellectual capital, management, Team or Founder, Cooperation with Other VCs, Product Nature, and Coherence are the parameters derived from their research. Gompers, Kaplan, and Mukharlyamov (2016) discuss the claims made by private equity firms. In this paper, they focused on private equity investors' behavior. At some point, investors in venture capital and private equity employ the same strategy. Numerous investors in private equity use the IRR (Internal Rate of Return) as a metric for evaluating investments. The same holds true for venture capitalists, as they also prioritize IRR (Gomper, Gornall, Kaplan, and Strebulaev, 2016). Similarly, to venture capitalists, private equity investors utilize the DCF and NPV techniques infrequently. This is also supported by (Reinfeld, 2018), which states that traditional valuation methods, such as the DCF method, trading multiple method, and transaction multiple method, cannot be used to conduct valuations. Table 1 summarizes each relevant parameter for making investment decisions.

Table 1: Summarize of Factor that determine VC investment decisions.

Author	Factor
Gompers et al. (2023)	There are 8 indicators which are: deal sourcing; investment selection; valuation; deal structure; post-investment value-added; exits; internal firm organization and relationships with limited partners.
Gornall & Strebulaev (2022)	The parameter are focused on financial contract, valuing the financial contract, and company valuation
Kaplan and Strömberg (2001)	pre-investment screening (sourcing evaluating and selecting investments), structuring investments, and post-investment monitoring and advising
Kaplan and Strömberg (2004)	Their study considers factors that include the attractiveness of the market, strategy, technology, product or service, customer adoption, competition, deal terms, and the quality and experience of the management team.
Sahlman (1990)	How VCs source their potential investments, a process also known as generating deal flow
Kaplan et al. (2009)	Factors which are more constant over the life of a successful VC investment. The concept of "Jockey" The entrepreneurial team and the "horse" the strategy and business model are detailed by them.
Gompers et al. (2010)	past success as an entrepreneur is crucial when attracting potential investments.
Widyasthana et al. (2016)	Nine important variables should be measure by CVC when they are investing in startup in Indonesia as follows: Geographic Location, Market Condition, Country Circumstances, Investment Timing / Stages, Intellectual Capital, Management, Team / Founder, Cooperation with Other VC, Nature of Product, Coherence

According to Fuhrmann and Lamba (2023), venture capital investments provide "seed" or start-up capital, early-stage financing, or mezzanine financing to enterprises in the early stages of development that require additional funding for expansion. Businesses then use these funds to support their growth and product development.

Janjigian (2023) divides the life cycle of a corporation into four distinct stages, each with distinct cash flow, business risk, firm status (private vs. public), and financing requirements features. Startups consist of more than just a concept and a business strategy. The founders provide the initial funding. If additional funding is required, the founders may appeal to friends and relatives, who may purchase a stake in the company or provide a loan. People sometimes refer to early-stage equity investors as venture capitalists or Series A investors. The company will require even greater amounts of capital as it advances through the growth stage. Most likely, while revenues and cash flows may be improving, the company is still not profitable, so it cannot yet rely on internally generated earnings to fund growth. It might raise more capital through a Series B or even a Series C issuance (i.e., additional rounds of capital raises). This is also the time the company might consider "going public" in an IPO.

Sandeep Dahiya and Korok Ray (2012) found that staged financing is an effective method for mitigating financial risk. They implied that staged funding introduces uncertainty into the early stages by creating the possibility of termination after the initial phase. This uncertainty reduces the anticipated surplus in stage one; hence, it is prudent to invest less in stage one. According to Susan Chaplinsky and Swasti Gupta-Mukherjee (2016), the percentage allocation of investment in the early stage correlates with the exit return, but there is no association between the early and late stages in terms of return on investment.

3. Research Design

3.1 Design

To begin with, the study of literature is necessary. We utilize bibliometric analysis from Haris and Rahadi (2023) research's to identify venture capital trends in Asia. These studies present the most discussed topics, receive the most citations, and feature the most influential journals. We also analyze a literature review to identify the initial parameters used by VC firms in start-up screening, building on the bibliometric analysis. We selected the research

by Gompers et al. (2023) based on its relevance and the completeness of the parameters that represent VC behavior in making investment decisions.

The author synthesized the Gompers et al. (2023) framework and expanded its parameters, including those not addressed in the research. These included the objectives of each investment round, the sources of funding, the parent company's influence on investment decisions, strategies for monitoring start-up performance over a specific timeframe, and conditions that necessitate exiting the investment. The author then incorporated these parameters into a series of interview questions to enhance the depth of the response. In contrast to Gompers et al. (2023), this research employs interviews to uncover nuanced and comprehensive data.

The interview method enables the following parameters to be deepened: Qualitative Assessment of Founders and Teams: Insight into the Perceived Qualities of Successful Entrepreneurs (Leadership, Resilience, Experience, and Communication Skills) We can deepen our understanding of how VCs evaluate the dynamics and cohesion of founding teams, as discussed by Widyasthana et al. (2016). The impact of regional market conditions and their variations throughout Southeast Asia warrants further examination. Gornall & Strebulaev (2022) concentrate on financial contracts for risk mitigation, which includes due diligence processes. Gompers et al. (2023) mention the prioritization of different investment criteria, such as financial metrics, but they can also extend this concept to understand alignment with the firm's investment thesis. An interview approach can also explore variations in criteria based on the stage of the investment, such as seed, Series A, and growth. Gompers et al. (2023) discuss post-investment involvement, such as the engagement between VCs and portfolio companies, and could potentially elaborate more on exit planning strategies to minimize investment risk.

To determine the sample of VC firms, we first identify VC firms located in the SEA region, classify them based on the firm's asset under management (AUM), and then concentrate on VC firms that invest in Indonesia and Singapore. This is because, according to Rudnik and Zhvirbo (2021), Indonesia and Singapore have the highest proportion of VC deals compared to other countries in the SEA region. We obtain a list of VC firms by examining private VC databases, such as Crunchbase. Initially, we compiled approximately 25 lists of potential venture capital firms. From the initial list of 25 potential venture capital firms, we identified only 18 VC firms with AUM data from Crunchbase, which we then narrowed down to 12 potential firms with an AUM exceeding \$100 million and a history of exiting their initial investment. The detailed information about the company's number of funds, AUM, investor type, number of investments, and number of exits is presented in Table 2.

Table 2: VC Firm Profile based on Screening Result

<i>No</i>	<i>Company</i>	<i>Number of Funds</i>	<i>Total Fund Raised (in Millions)</i>	<i>Investor Type</i>	<i>Investment Stage</i>	<i>Founded Date</i>	<i>Number of Investment</i>	<i>Number of Exits</i>
1	MDI venture	5	\$830.00	Corporate Venture Capital, Venture Capital	Early Stage Venture, Late Stage Venture, Seed	2016	84	11
2	BRI venture	2	\$271.20	Corporate Venture Capital	Early Stage Venture	2018	28	1
3	SMDV	<i>No data</i>	<i>\$1000</i>	Venture Capital	Early stage, late stage	2014	49	5
4	Alpha JWC Venture	4	\$606.00	Venture Capital	Early Stage Venture, Late Stage, Venture, Seed	2015	97	5
5	AC Venture	4	\$575.00	Venture Capital	Early Stage Venture	2020	75	1
6	East Venture	7	\$1,100.00	Venture Capital	Early Stage Venture, Seed	2010	538	51

7	Kejora Capital	4	\$172.00	Venture Capital	Early Stage Venture, Late Stage Venture, Seed	2014	24	4
8	Venturra	1	\$150.00	Venture Capital	Early Stage Venture, Seed	2015	37	3
9	Northstar Group	3	\$2,200.00	Private Equity	Early Stage Venture, Late Stage Venture, Private Equity	2006	33	1
10	Insignia Ventures Partner	5	\$808.00	Venture Capital	Early Stage Venture, Seed	2017	108	2
11	Golden Gate Ventures	3	\$170.00	Venture Capital	Early Stage Venture, Seed	2011	111	10
12	Open space	5	\$625.00	Venture Capital	Early Stage Venture	2014	83	6

Using those companies' lists, we began to contact and distribute the set of questions to the VC firm in early 2023. We contacted a total of 12 VC firms, then sent a set of questions linked to these firms' representatives who expressed an interest in the interview section. Of these, only six respondents represent five VC firms that are willing to do a face-to-face interview. We finished conducting our last interview in Q4 of 2023.

3.2 Methodology

3.2.1. Research Methods

(Cumming et al., 2022) have mapped the preferred method for research in venture capital and private equity from 2001 to 2021. The overall nature of the research involves an empirical approach, with a preference for quantitative methods. For data collection, the scholar primarily relies on archives, as opposed to surveys, interviews, or even case studies. Based on that finding, this study attempts to use a different approach than previous scholars to gain a better understanding of the subject by focussing on the VC firms that employ them (Levasseur et al., 2022).

In alignment with the research question, which is to determine parameters that influence VC firms in evaluating investment decisions, this research adopts a qualitative method for research design. We consider this method appropriate for addressing the research questions due to the interpretive philosophy inherent in qualitative research (Denzin and Lincoln, 2005), which necessitates a thorough investigation with a limited data set (Saunders et al., 2019). The qualitative method is also associated with exploratory studies, which is relevant to this research approach. The qualitative method employs the three coding stages (Strauss & Corbin, 1998): open coding, axial coding, and selective coding. These coding processes are helpful to define parameters that influence VC firms until they integrate these parameters to produce an investment decision framework for VC firms.

In terms of research methods, this study employs a case study approach. We can treat each VC firm we interview as a single case. This approach can deeply investigate and describe each firm's practices, experiences, and unique characteristics. For the data sample, this research uses primary data collected via semi-structured interviews. The respondent is a venture capitalist from a different VC firm in the SEA region. Semi structured interview is also in line with the exploratory study (Saunders et al., 2019). Based on a literature review, we expect this method to explore the qualitative parameters that influence VC investment decisions, particularly in the early stages.

This research uses the Gompers et al. (2023) framework to determine the initial measurement parameters. The researchers then use these parameters as a baseline to formulate a set of interview questions. Gompers et al. (2023) reveal a comprehensive study regarding how venture capitalists make investment decisions. The decision model by Gompers et al. (2023) is considered holistic since those studies are extended from several previous studies, including pre-investment screening (sourcing, evaluating, and selecting investments), structuring investments, and post-investment monitoring and advising by Kaplan and Strömberg (2001). Sahlman (1990) referred to the process

of VCs sourcing potential investments as "generating deal flow." Kaplan and Strömberg (2004) conducted a study on VC investment selection decisions. Kaplan and Strömberg (2004) also discuss market attractiveness, strategy, technology, product or service, customer adoption, competition, deal terms, and the quality and experience of the management team. The concept of "Jockey" The entrepreneurial team, concept of "horse" the strategy and business model are detailed by Kaplan et al. (2009). Another important factor identified by Gompers et al. (2010) is past success as an entrepreneur. The Gompers et al. (2023) study gathered and refined all these parameters, thereby enhancing their comprehensiveness.

The primary data from Gompers et al. (2023) are particularly noteworthy, as they include 1110 individual responses in total, which they filtered down to 885 institutional VC respondents, representing 681 VC firms. Given the data-driven nature of the venture capital challenge study, we selected Gompers et al.'s (2023) decision model as the baseline for this study due to their provision of primary data and comprehensive analysis.

However, this research addresses a gap in those parameters by separating them based on the stages of a start-up firm. The study divides the parameter into two general stages: the early and late stages. This study, however, separates those parameters as per detailed stages: early, pre-series, series A, series B, series C, and pre-IPO. The literature review highlights that each stage of a start-up firm possesses unique characteristics, necessitating the adaptation of VC firm strategy to each stage's start-up conditions.

3.2.2. Semi Structured Interview

This study used semi-structured interviews for data collection. We selected this approach to identify patterns of behavior over time and observe respondent behaviors during their engagement activities (Cressweel, 2018). It is necessary since the research objectives are to understand venture capital firm behavior in evaluating investment decisions. We need to conduct semi-structured interviews to gain a detailed understanding of the parameters that influence venture capital firms' investment selections.

The author then developed a set of questions based on a literature review, which resulted in 13 parameters. Table 3 presents the detailed parameters. The author initially tests the questions on several professionals and lecturers to reflect anomalies in focused questions, then continues with iterations to obtain the optimum set of questions. The set of questions is then linked and delivered to 12 targeted companies, where only 6 representatives are willing to get an interview scheduled.

Table 3: Themes and Parameter Definition

Themes	Definition	Parameter Measurement/ Code
VC Fund Structure & Strategy	Elaborate VC AUM, Funding Round	AUM
Start-Up Stages/ Investment Timing	Define Start-Up life stage including ticket size per size	Pre seed, seed, pre series, series A, B, C, Pre-IPO, IPO
Start-Up Value (EV, PMV, etc)	Elaborate Start-Up Valuation based on historical data	Enterprise Value, Post-Money Valuation, Cost of Capital
Start-up Performance/ Benchmark (Risk & Return)	Elaborate Start-Up performance based on historical financial statement	IRR, Hurdle Rate, DPI, Runway
Management Team/ Founder	Qualitative metrics to understand founder background and team coherence	Founder history, team coherence, etc
Business Model	It refers to company's plan for making a profit	Significantly reduces costs while maintaining quality, demonstrated profitability
Industry	Identify Industry of start-up that VC invested in	Finance, Education, Agriculture, Telco, etc.

Product/ Services	Analysis product/ services toward market acceptance	<ul style="list-style-type: none"> - Superior technology with large market potential, - Has built a robust, scalable system that can meet the current market demands, - Best product on the market.
Attractiveness of Market/ Trend	Understand market trends, how attractive it is toward the product/ services, the urgency to be scaled or etc.	Market trend, product-fit to the market, market segmentation
Ability to add Value	Identify value creation to Start-up	Deal selection, VC value added
Due Diligence/ Financial Contracting	Understand DD/ financial contracting that affect investment decision	Convertible preferred stock, liquidation preference, participation, cumulative dividends, stock option, convertible notes, SAFE, venture debt
Start-up Valuation Method	Determine the suitable and important method that frequently used by VCs per stage	NPV, MOIC, EV/EBITDA, EBIT, Revenue, Monthly Active users, PMV, etc
Exit	Determine parameter that effect exit timing for investment	Start-Up Value, Performance, Market condition
Risk Management	Approach of control and reduce total risk	Diversification

3.3 Respondent Profile

3.3.1. Respondent profile

We have meticulously selected a diverse group of respondents from leading venture capital firms. The respondents' profiles encompass various levels of seniority and functional roles within their respective organizations, ensuring a comprehensive and multi-dimensional view of the decision-making processes. The respondents range from junior associates to senior executives (CEOs and managing directors), capturing a wide spectrum of perspectives within the VC firms. This diversity allows for an exploration of both strategic decision-making at the executive level and operational processes at the associate level.

Table 4: Respondent Profile

Respondent	Position	Company
Respondent 1	CEO	VC Firm A
Respondent 2	Senior investment associate	VC Firm B
Respondent 3	Junior investment associate	VC Firm B
Respondent 4	Investment professional	VC Firm C
Respondent 5	Investment professional	VC Firm D
Respondent 6	Managing Director	VC Firm E

Each respondent is involved in early-stage investments, aligning with the research focus. Their experiences and insights provide specific knowledge about the unique challenges and opportunities in funding early-stage startups, which differ significantly from later-stage investments.

3.3.2. VC firm profile

We have compiled data from the Crunchbase database on several key venture capital (VC) firms operating in the region. This data includes the assets under management (AUM) and the total number of funds raised by each firm; see figure 2. These metrics are critical in understanding the scale, experience, and capacity of these firms to invest in emerging markets.

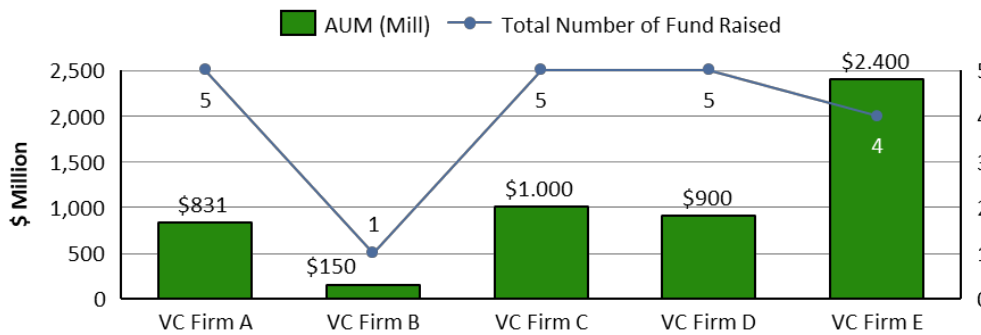


Figure 2: VC Firm Respondent Profile based on AUM and Number of Fund Raised

The selected firms exhibit a range of financial capabilities and experiences, as indicated by their Assets Under Management (AUM) and the number of funds raised. These range from smaller firms, such as VC Firm B, with a modest AUM of \$150 million and a single fund, to larger entities, such as VC Firm E, which manages \$2.4 billion across four funds. This variation provides a comprehensive view of how different levels of capital and fund management experience influence strategic investment choices.

We then conducted the ticket size interview, revealing significant variability in their investment scales, reflecting diverse strategies and risk appetites within the Southeast Asian emerging markets. VC Firm A exhibits a wide range, with a maximum investment of \$40 million and a minimum of \$0.1. VC Firm B and VC Firm D have a more conservative maximum ticket size of \$15 million, suggesting a focus on smaller, potentially less risky investments. VC Firm C stands out with the highest maximum ticket size of \$50 million. Conversely, VC Firm E maintains a more modest range, with a maximum of \$10 million (see figure 4). The consistency in the minimum investment across most firms, at around \$1 million, highlights a common baseline for early-stage start-ups.

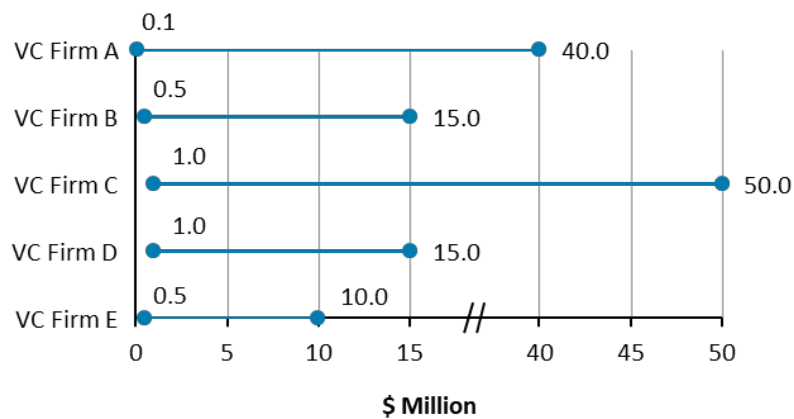


Figure 3: VC Firm Profile based on Ticket Size (in \$ Million)

3.3.3. VC firm investment scope

We then inquire about the portfolio that each venture capital firm has invested in. Firms in Indonesia, such as VC Firm A, VC Firm B, and VC Firm C, primarily invest in Indonesia, but they also make investments in nearby countries like Vietnam and the Philippines. Conversely, Singapore-based firms, including VC Firm D and VC Firm E, maintain a substantial focus on Indonesian markets but also extend their investment portfolios to include other regional markets and international opportunities. See table 5.

Table 5: VC Firm Investment Scope Profile

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Office Listed Location	Indonesia	Indonesia	Indonesia	Singapore	Singapore
Portfolio diversification geographics	• 60% Indonesia • 40% SEA, Japan, Australia, etc	• 60% Indonesia • 40% SEA: Vietnam, Phillipines, etc	• Indonesia (Majority) • Japan • US	• 60% Indonesia • 40% Vietnam, Phillipines	• Indonesia (majority) • Vietnam and Singapore

4. Finding and Analysis

4.1 Industry Preference

Industry is a parameter that represents investment segmentation. It also represents the business's trend and appeal. Every VC has different perspectives regarding their industry preferences. The VC fund structure may influence their preferences, as it shapes their objectives. Table 6 presents the results of this interview.

Table 6: VC firm Industry preference profile

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Industry Preferences	Agriculture, Logistics, Edu-Tech., Healthcare, Fintech	Mostly: fintech, Health-tech. Rarely: Edu-Tech, renewable energy	All sector	Tech Enable Companies: E-commerce, fintech, agrifood	All sector

4.2 VC fund structure & strategy

We use the VC fund structure's theme to map the source of funding and type of VC. Since different VC fund structures affect their investment decisions, The interview led to the division of the VC fund structure into three categories: GVC (government venture capital), CVC (corporate venture capital), and IVC (independent venture capital). The commonality between CVC and GVC is that their fund sources come from their parent company. The distinction is that GVC fund parent companies are government companies, whereas CVC parent companies are private companies. The IVC does not have a parent company. This type of fund source affects a variety of investment strategies. Table 7 presents the VC fund structure of each company.

Table 7: VC fund structure and strategy

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
VC Investment Type	Equity Fund - Direct Investment - Start-Up	Direct Investment - Start-up	<ul style="list-style-type: none"> • Direct - Nonstrategic investment • Direct - strategic investment Fund of Fund	Direct Investment - Start-up	Direct Investment - Start-up
Reason behind Industry selecting	Direct order form LP, based on parent Business Industrial Scope	No Direct order from LP, based on company expertise	Direct order from LP	No Direct order from LP, based on internal company assessment	No Direct order from LP, based on internal company assessment

This table illustrates the impact of VC fund structures on industry selection. We group the respondents based on the type of fund structure. GVC: VC firm A; CVC: VC firm B and VC firm C; IVC: VC firm D and VC firm E

4.3 Start-up valuation method

The start-up valuation method serves as a framework for interpreting company valuation. It is important because each stage has its own set of values and financial structures. This theme exemplifies the appropriate and crucial approach that venture capital firms frequently employ. The several financial ratios that represent valuation are: NPV, MOIC, EV/EBITDA, EBIT, Revenue, Monthly Active Users, PMV, etc. Table 8 presents the results of the interview for this theme.

Table 8: Start-up valuation and financial metrics

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Valuation	Comparable analysis	Comparable Analysis: Average Revenue Multiple for Private and Public Companies in the Same Industry	Multiple factors in same industry	Comparable Analysis for Valuation per Industry	comparable analysis in similar industries (P/E and P/S)
Other Financial Metric (1)	Revenue	Projected EBITDA	<ul style="list-style-type: none"> • Revenue Projection • Recent Valuation 	Income Projection/ Valuation Comparison (4-5 years)	Revenue and EBITDA
Financial Metric (2)	-	Burn Rate	-	Ownership upon entry & company valuation upon exit	-
Financial Metric (3) ¹	-	Runway	Runway	Runway/ Cash Level	runway

**Findings for this research*

4.4 Exit

The theme of exit is associated with factors such as investment duration, timing, and market conditions. It is a theme that is significant for VC firms to achieve their investment goals. Start-up post-money valuation and start-up recent performance are two of the factors that contribute to exit judgment. Every type of VC firm has set different criteria for their investment exit. Table 9 presents the results of the interview on this theme.

¹ When the VC firm respondent values the start-up and considers the runway number, they reveal the financial metric (3) in the interview.

Table 9: VC funds exit preferences

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Type of Exit	IPO, Pre-IPO	Private Sales, M&A Deals (Acquisition: Share Swap), IPO	IPO, Private Sales	Private sales	IPO/ Private Sales
Investment Duration	8 years (3 years: investment, 3 years: portfolio management, 2 years: diversification)	3 - 5 years	2 - 3 years	-	7 year
Factors that Contribute to Exit	-	Reach Firm Target	Reach Firm Target, Mediocre Growth	Reach firm target (\$1 Mill valuation)	Depend on entry point, revenue target: ± \$100 Mill

4.5. Screening Criteria

The management team and founder's background are two important qualitative metrics for venture capitalists. It is a theme that measures intangible assets, such as team coherence. The founder's historical background is also important since the founder is the leader of the team. Table 10 presents the results. In Table 10, we can see several parameters that become considerations for each VC firm. Every VC firm mentions the founding team, including their experiences, educational background, and skills, as one of the essential factors that affect the firm's investment decisions.

Table 10: VC fund structure and strategy

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Founder, history, team coherence, etc	<ul style="list-style-type: none"> • Geographic Location • Market Condition • Country Circumstances • Investment Timing/ Stages • Intellectual Capital • Management Team/ Founder • Cooperation with Other VC • Nature of Products • Coherence 	<ul style="list-style-type: none"> • Founder Industry Experiences • Cohesive Team • Entrepreneurial Experiences 	<ul style="list-style-type: none"> • Management Team • Founder Skill • Product • Market • Business Model • Trust - sense of entrepreneurship 	<ul style="list-style-type: none"> • Number • Founder Experiences • Market 	<ul style="list-style-type: none"> • founding team (experiences, educational background) • business model (has this model it's been invested by our VC firm, match or now with our investment thesis) • market size (is the market size are big enough?) • traction

4.6. Risk management

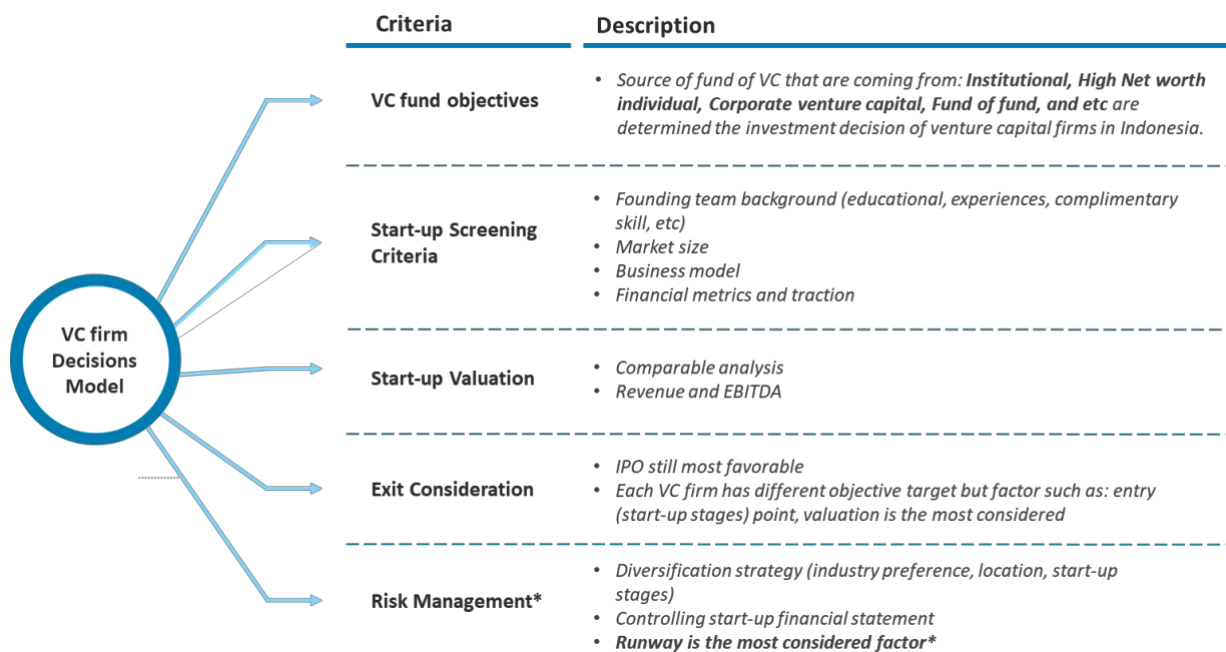
Risk management is a theme that represents how VC firms manage total risk in order to achieve their investment goals. Measurement parameters for risk management include monitoring activity (strategy, period, etc.) and financial ratios related to risk management (runway, cash on hand, etc.). We then translate those measurement parameters into a set of interview questions. Table 11 presents the resulting interview.

Table 11: VC firm risk management criteria

Parameter	VC Firm A	VC Firm B	VC Firm C	VC Firm D	VC Firm E
Financial/ report monitoring period	monthly	monthly	monthly	monthly	monthly
Start-up monitoring/ risk mitigation	Monthly report monitoring	Maintain Revenue	Cash balance monitoring	<ul style="list-style-type: none"> • Report to Insignia If startup want to withdraw at certain of money • Director Salary must report to VC firm • Financial audit by reputable auditor 	<ul style="list-style-type: none"> • milestone crosscheck • validate runway number with milestone achievement
Financial Metric to be monitored	Runway	Runway	Runway	Runway	Runway

5. Conclusion

We have identified five key criteria of VC firm decision parameters to evaluate investment decisions for start-ups in the SEA region.



* Finding a new parameter

Figure 4: VC firms decisions model

This study presents extended evidence from the Gompers et al. (2023) framework. There are 5 parameters or themes that affect VC firm investment decisions; see figure 4. The determination of these themes relies on measurement parameters. This parameter is a qualitative metric. This study also presents a new theme, which is risk management. As previously discussed, the measurement parameter pertains to monthly monitoring activities, which they view as a crucial financial metric for close monitoring and evaluation. Runway refers to the company

lifeline because it gives information about the amount of time, in months, a start-up has before it runs out of cash, which is important for VC firms to consider in making investment decisions.

6. Limitation and Future Research Suggestion

This study focuses primarily on the perspective of VC firms and may not capture the viewpoints of other stakeholders, such as entrepreneurs, government bodies, or limited partners. Additionally, as with any research, limitations in generalizing the findings to a larger population may exist due to the specific context and small sample size. Since getting an interview with VC firms is very difficult, it could be an obstacle to doing venture capital research.

This study gives an understanding of the parameters that affect VC investment decisions in Indonesia. Future research could separate the analysis of parameters at each stage. Early stages have different behavior compared to series A, B, and late stages, so the researcher should focus on each stage's behavior.

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Finding: not applicable

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Shifting Resource Configuration of the Creative Businesses in the Perspective of Digital Economy

Fadhilla Sandra Adjie¹, Wawan Dhewanto², Ira Fachira³

^{1,2,3} School of Business and Management, Bandung Institute of Technology, Bandung, Indonesia

Correspondence: Fadhilla Sandra Adjie, School of Business and Management, Bandung Institute of Technology, Bandung, Indonesia. E-mail: fadhilla_sandra@sbm-itb.ac.id

Abstract

Extant literature has identified how the digital economy has transformed the types of resources available to creative businesses, both tangible and intangible. Since previous research on the digital economy's influence over these resources is limited, yet remains pertinent in reshaping the resource configuration. By analyzing 25 articles, we identified and explored how resource allocation of the creative businesses shifts. As it is driven by the digital economy, which contributes to and shapes the overall digital economy. The findings highlight (1) types of resources in the creative businesses; (2) challenges and opportunities faced by creative businesses; (3) impact of digital economy on creative businesses' resource allocation strategies.

Keywords: Creative Industry, Creative Businesses, Digital Technologies, Resource Allocation, Digital Economy

1. Introduction

Creative industry (CI) is a dynamic industry that heavily relies on both knowledge-intensive and labor-intensive processes. CI involves cycles of creating, producing, and distributing goods and services that are anchored more in creative inputs such as creativity, skills, and intellectual capital (Indriartiningtias et al., 2019). It functions as an ecosystem that centres the innovation process of individual creativity, a dynamic and knowledge-intensive sector that plays a crucial role in driving economic growth and innovation (Bhatiasevi & Dutot, 2014; Madudová, 2017). It encompasses a wide range of businesses from large corporations to small firms (F. Li, 2020), and spans various domains, including both digital pioneers and traditional sectors that have embraced digital tools (Fachrunnisa et al., 2020). CI thrives on human creativity, cultural awareness, and interpersonal skills, making it less susceptible to automation compared to other fields (Buchoud et al., 2021; Sonobe, 2022). This human element positions the CI sector for continued growth in the digital age. This industry is selected in this paper's context for their broad coverage in both traditional and digital native sectors altogether (F. Li, 2020).

Creativity is the pillar of the CI, fuelling the generation and transformation of ideas into valuable outcomes. This creative input, combined with intellectual capital and the skills of the workforce (Indriartiningtias et al., 2019), forms the foundation for innovation within the CI. Unlike most industries, where the value chain might begin with existing materials or concepts, the CI operates through a distinct value chain centred on creative idea generation. This chain encompasses the entire life cycle of a creative product or service, starting from the conception to product

creation, production, distribution, to retail and consumption (Gohoungodji & Amara, 2022). This emphasis on human capital and intangible assets fuels the CI's unique value-creation process, which ultimately contributes to economic growth by generating economic value through creativity-driven process (Abbasi et al., 2017; Machmud & Ahman, 2019). The creative industries have emerged as a pivotal force in the global economy, driving growth, employment, and cultural vibrancy (Zhao et al., 2024).

The digital economy (DE) is the economic activities which fully integrate digital technologies to empower stakeholders to create value, requires significant resources and capabilities (Jing et al., 2023; Matarazzo et al., 2021). Digital technologies also help to promote the development of CI by improving innovation efficiency through the mediation of information asymmetry, accelerating the flow of creative elements, optimizing allocation of capital, human, and creative resources, and embedding new strength into the growth of creative businesses (Zhao et al., 2024; (Rong, 2022). On the other hand, the creative industries, with their emphasis on innovation and human capital—significantly contribute to the DE by generating new digital content, products, and services. This symbiotic relationship fuels economic growth and expands market opportunities for both creative sector and the broader digital economy by unlocking new opportunities such as increasing innovation, productivity, and connectivity (Büyüközkan & Göçer, 2018; Jordan & Richterich, 2023; Worldbank, 2023)

Recognizing the crucial role of CI in driving innovation and economic growth, stakeholders; such as national and global authorities, policymakers, and businesses; are increasingly focused on fostering its potential (Abbasi et al., 2017). Harnessing the CI's impact on innovation and economic growth necessitates strategic investments in infrastructure and employee training (Rong, 2022). Moreover, nurturing creativity within the workforce is essential, as innovation is fundamentally rooted in the skills, knowledge, and creative potential of employees (Salder, 2021). Therefore, accelerating the growth of the CI sector necessitates a combined effort that leverages the creative power of human capital and transformative potential of the digital tools and platforms that fuel the digital economy. This synergy will enable the creative businesses to reach new heights of innovation and development (Yao et al., 2023), as previous studies have paid insufficient attention to the effects and potentials that the digital economy and creative industry can bring (Zhao et al., 2024).

While the creative industry has traditionally relied on specific resources to fuel innovation and economic value creation, the emergence of the digital economy raises critical questions about the types of resources required by creative businesses. However, limited research exists on the precise ways in which the digital economy has transformed these resources needs, whether tangible or intangible (Zhao et al., 2024). This knowledge gap hinders our understanding of how creative businesses can best adapt and thrive in this evolving digital world. Therefore, this study aims to explore how the digital tools and resources available to creative businesses are changing due to the digital economy and how it contribute to and shape the overall digital landscape. Through systematic review, the purpose of this research is to identify gaps and provide valid suggestions related to the shifting configuration of resources of creative businesses in the context of digital economy. By investigating several research questions; *(1) how has the Digital Economy impacted the types of resources of creative businesses? and (2) how do the creative businesses adapt their resource allocation strategies to address the challenges and opportunities associated with this shift?*

This article is structured as follows. First, the article describes the literature review that includes digital economy and creative industries in the current study. Followed by the research methodology that employs PRISMA method protocol, which will be continued with the results and discussion of the overall findings. Finally, the main conclusions are also discussed in the latter section.

1.1 Digital Economy

The rise of digital economy (DE) growth on a global scale is driven by advancements in digital technologies and a shifting environment characterized by volatility, uncertainty, complexity, and ambiguity (VUCA) (Autio et al., 2018; Solomon & van Klyton, 2020). This environment necessitates business agility due to rapidly changing market conditions. Organizations must adapt their processes to effectively leverage digital technologies and navigate the market to achieve optimal efficiency. Digital transformation is the cornerstone of this circumstance,

navigates businesses to uncover new opportunities in optimizing their process, lowering costs, reducing waste, attracting more customers, increasing brand loyalty, embracing new business models, and leveraging co-creation value. Furthermore, the digital economy has become a prominent agenda for global institutions such as OECD, World Bank, World Economic Forum (Shen et al., 2022; Yusuf, 2022).

The digital economy is a term commonly used to describe a broad spectrum of economic activities driven by digital information and knowledge. It prioritizes productivity growth and optimization through the utilization of digital resources, such as data, software, and technology infrastructure (Rong, 2022; Sun et al., 2023). These resources empower businesses to facilitate value creation and customer engagement (Matarazzo et al., 2021). DE also disrupts traditional patterns across various scales, from micro to macro, promoting industrial integration and economic efficiency by creating more effective channels for information sharing, encouraging industrial innovation and economic structural transformation (Wang et al., 2023). Essentially, DE revolutionizes economic activities by altering firm's operational practices. This shift depends on the integration of digital technologies, which enables the enhancement of business processes, such as customer experience and operational streamlining (Fitzgerald et al., 2014; Liu et al., 2011). Consequently, businesses benefit from increased efficiency, reduced costs, broader market reach, job creation, and ultimately, contribute to overall economic development (Rong, 2022).

However, integrating new technologies to leverage creative businesses' resources can be a complex process that requires deliberate management and adequate resources and capabilities (Jing et al., 2023). Small and medium-sized enterprises in the digital economy face distinct challenges due to limited resources (Cao & Weerawardena, 2023) compared to larger firms. Fewer SMEs encourage their employees to acquire digital skills, in which exacerbates the digital divide (OECD, 2021). Additionally, the complexity of advanced digital tools further widens the gap between SMEs and larger firms. These resource gaps impede SMEs' digital transformation journey and reduce the likelihood of adopting new digital solutions (Rupeika-Apoga et al., 2022). Specific resource gaps encompass environmental resources, knowledge, and digital skills, financial resources, proper digital infrastructure, and trained personnel (Arbore & Ordanini, 2006; Ayinla & Adamu, 2018; Saka et al., 2022; Taylor & Murphy, 2004). Consequently, SMEs struggle to overcome obstacles such as lack of information, awareness, and affordable digital infrastructure.

1.2 Creative Industries and Creative Businesses

The Creative Industries (CI), according to the UK Department of Culture, Media, and Sports (DCMS)—encompasses a diverse range of sectors that rely on individual creativity, skill, and talent to generate intellectual property and drive economic growth. This definition is widely adopted as a global standard, and identifies thirteen core sectors within the CI that comprise advertising, architecture, design, fashion, film and video, music, performing arts, and publishing (F. Li, 2020). These sectors play a crucial role in fostering innovation within an economy through several key mechanisms.

In general, CI plays three roles in contributing to the innovation potential of an economy which comprises; (1) creating and commercializing new ideas that lead to novel products and services; (2) heavily relying on and pushing the boundaries of technology, driving adaptations and advancements; (3) and offering creative services that fuel innovation across various businesses and organizations (Matiza, 2020). Therefore, economic development can be observed through the commercialization of human ideas in creative industries, where the skills and knowledge of human talent are central generating the necessary inputs for economic growth (Matiza, 2020). This emphasis on human capital underscores the critical role of human element within the CI sector. Furthermore, research suggests that CI demonstrates greater resilience compared to other industries during economic downturns and periods of turbulence. This adaptability is likely a result of the inherent flexibility and innovative capacity embedded within the CI sector (Yao et al., 2023)

The creative industry's emphasis on value creation contributes to its structural distinctiveness. Compared to other sectors, the creative industry exhibits less emphasis on replication and places greater importance on content creation (Salder, 2021). This focus on value creation is further bolstered by the industry's reliance on human

capital, where the creativity, talent, and adaptability of employees are critical components, allowing them to respond effectively to external changes and identify new trends (Fachrunnisa et al., 2020). CI is dominated by SMEs including micro-enterprises and freelancers, representing 85 percent of all actors (Worldbank, 2023). It encompasses various businesses, from large corporations to small firms (F. Li, 2020), including both digital pioneers and traditional sectors that have embraced digital tools. Notably, CI includes areas where the digital revolution is still evolving. Unlike many fields susceptible to automation, the creative industry thrives on human creativity, cultural awareness, and interpersonal skills (Buchoud et al., 2021; Sonobe, 2022), making jobs in this sector more resistant to automation and positioning the sector for growth. The combined effect of the creative industry and SMEs fosters job creation, cultural exchange, and revenue generation—all key pillars of a thriving creative economy.

Unlike traditional industries, CI prioritizes originality and adaptability. Spanning from large corporations to SMEs, the sector encompasses both digital pioneers and established players. Within the creative industry often demonstrates resilience to automation due to its human-centric nature (Buchoud et al., 2021; Sonobe, 2022). In this context, creative businesses are distinctive for their emphasis on innovation, human capital, and value creation (Fachrunnisa et al., 2020; Salder, 2021). Creative businesses are entities that prioritize added value elements stemming from new value creations. As a result, they are structurally distinctive with fewer tasks in replication which heavily relies on the diverse and specialized set of skills and knowledge that allow them to respond to external change and identifying new trends (Salder, 2021).

2. Method

2.1 Research Design

Systematic Literature Reviews (SLRs) are recognized as an effective method for systematically examining and appraising a specific body of scholarly work (Mariani et al., 2022). This study systematically reviews and identifies gaps in the literature, aiming to provide recommendations related to the resource shifting of creative businesses in the digital economy. This process involves searching through two science databases such as from Science Direct and Proquest. The systematic literature review process began by identifying relevant keywords to be used as search strings, we used Boolean logic in order to refine the search results we employ “AND” and “OR” to establish logical relationships among the keywords. To address the gap on how the digital economy has changed the types of resources needed by creative businesses, this study aims to perform a systematic review using PRISMA protocol which provide a precise mechanism to minimize researcher bias and explore the research process (Hossain et al., 2022).

2.2 Literature Search

Upon conducting various keyword combination searches across two academic databases, this study employed a three-step approach. First, core keywords encompassing the digital landscape were utilized, including “digital economy” and “resource”. Second, to capture the creative sector, a range of synonyms were included, such as “creative industry”, “cultural industry”, and “creative businesses”. This comprehensive keyword strategy aimed to ensure the retrieval of a broad and relevant selection of studies. Additionally, filters were applied to restrict results to articles published within the last seven years (2017 until 2024) to ensure the retrieval of a broad and relevant selection of studies, with research articles type only that obtained from academic journal as the source. Followed with the selection process, from which duplicate entries were meticulously removed using reference management software such as Zotero. The remaining articles were subjected to a title and abstract screening process to identify relevant studies within the fields of business, management and accounting subject areas, and sourced from academic journals due to restrict to high-quality journals papers that are peer-reviewed. Titles and abstracts were assessed for their alignment with the research topic, specifically the impact of the digital economy on resource allocation within creative businesses. Studies deemed irrelevant or out of scope were excluded during this stage.

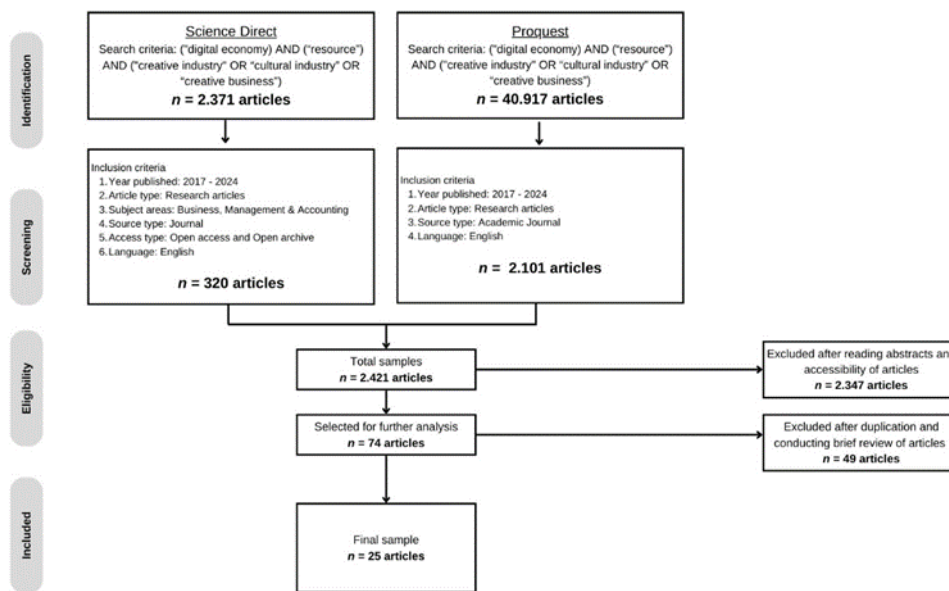


Figure 1: Article selection

To ensure a focused and relevant review, a set of pre-defined inclusion and exclusion criteria were applied to the shortlisted articles after the title and abstract screening. These articles were included by following these criteria such as (1) published between 2017 and 2024 to ensure recent and up-to-date research, (2) classified as research articles, (3) focused on the fields of business, management and accounting to maintain thematic alignment, (4) using sources from peer-reviewed academic journals, (5) available in English for facilitating accessibility and analysis. The articles that did not meet these criteria were excluded from the review. This rigorous screening process ensured that the final sample comprised high-quality research articles directly addressing the research question. After the eligibility of research paper has been identified accordingly, the research papers that are included are 25 articles.

3. Findings and Discussion

3.1 Descriptive Analysis

This section presents a descriptive analysis of the studies identified through our systematic literature review (SLR) process. Specifically, we analyze the distribution of studies by research objectives, types of resources used within creative industries, challenges and opportunities faced by creative businesses, and the impact of digital economy on creative businesses' resource allocation strategies to identify patterns in research activity. These descriptive analyses provide a foundational understanding of the current state of research on the topic and pave the way for a deeper exploration of the key themes and findings identified in the review.

Table 1: Research Key Themes

References	Subject of Analysis	Subsector
Fernandez-Lores et al., 2022	SMEs	Museum
Gornostaeva, 2023	SMEs	Fashion
Hsu et al., 2023	SMEs	Museum
Ji et al., 2022	SMEs	
Kwon et al., 2022	SMEs	
J.Li., 2022	SMEs	Craft
Novani et al., 2022	SMEs	Games & animation, Museum
Raimo et al., 2022	SMEs	Museum

Rayna & Striukova, 2021	SMEs	
X. Zhang et al., 2022	SMEs	
Burnes & Choi., 2021	Individuals	Music
Fauchart et al., 2022	Individuals	Music
Jahromi & Ghazinoory., 2023	Individuals	Games & animation
Matiza, 2020	Individuals	Music, Fashion
L. Zhang et al., 2023	Individuals	Craft
Chen et al., 2022	Industry	Craft
Pang et al., 2022	Industry	Fashion
Purbasari et al., 2020	Industry	Games & animation
Wang et al., 2023	Industry	
Xi et al., 2022	Industry	Games & animation
Yao et al., 2023	Industry	
Alexandri et al., 2019	Large firms	Museum
Landoni et al., 2020	Large firms	Games & animation
Kefi et al., 2024		Museum
Imawan et al., 2023		Music

From the findings above reveal that the subject of analysis focuses on small and medium-sized enterprises (SMEs) within the creative industries, suggesting a potential research gap in understanding the challenges and opportunities. While SMEs are the primary focus, there is a need for more research on the industry level and the individual creator's perspective to gain a comprehensive understanding of the creative landscape. Followed with the research trends tend to concentrate on a few specific subsectors, namely games, animation, museums, music, craft, and fashion. Other creative subsectors, such as advertising, design, and performing arts, are underrepresented in the literature.

In terms of research methodologies employed within the sample articles revealed a dominance of qualitative approaches as shown from twelve articles (Alexandri et al., 2019; Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Fernandez-Lores et al., 2022; Hsu et al., 2023; Imawan et al., 2023; F. Li, 2020; Matiza, 2020; Purbasari et al., 2020; Raimo et al., 2022; L. Zhang et al., 2023). They utilized qualitative methods to explore the shifting resource landscape of creative businesses in the digital economy, as qualitative methodologies are well-suited for in-depth exploration of experiences, allowing researchers to gain rich insights into how creative businesses navigate this complex environment. However, compare to quantitative research approaches were also present in the sample articles that represented in seven articles only (Ji et al., 2022; Kwon et al., 2022; Pang et al., 2022; Wang et al., 2023; Xi et al., 2022; Yao et al., 2023; L. Zhang et al., 2023).

This study reveals that the creative industries are primarily focused on SMEs, while some studies examine individuals, industries, or large firms. The study also found a concentration of research on specific creative subsectors such as games, animation, museums, music, crafts, and fashion. In addition, regarding to the research methodologies—qualitative approaches are more common, reflecting the distinctive nature of the creative industries.

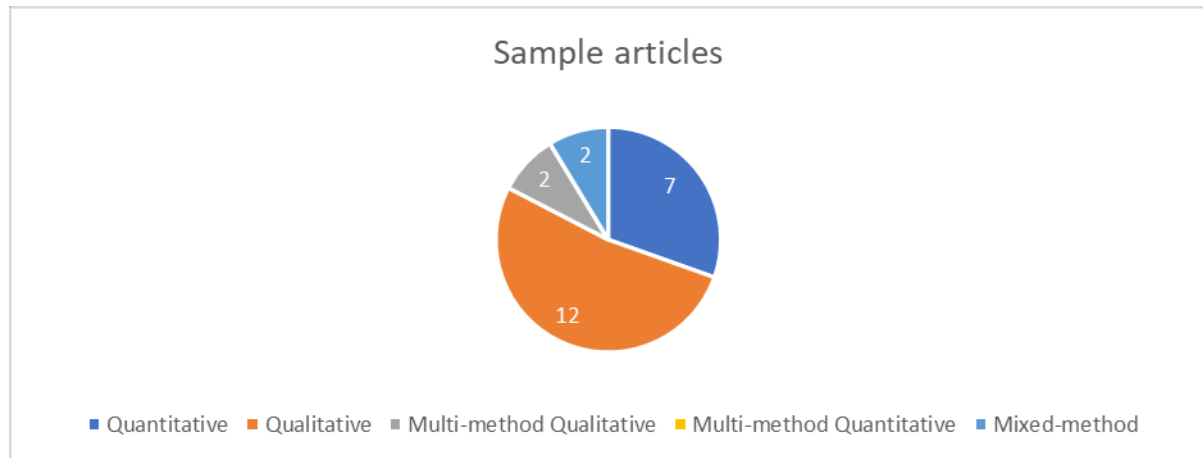


Figure 2: Sample articles according methods

3.2 Research Area

The sample articles indicate the emergence of research objectives that are dominantly emerged within the area of creative businesses and digital economy. Several studies (Burnes & Choi, 2021; Gornostaeva, 2023; Imawan et al., 2023; Kefi et al., 2024; J. Li, 2022; Raimo et al., 2022) highlight the critical role of digital transformation within creative businesses. These studies focus on how these organizations are adapting and integrating digital technologies into their core functions. This digital transformation likely necessitates a shift in a resource allocation, requiring investments in new technologies, upskilling workforce, and developing new digital strategies. Understanding these transformative processes is crucial for creative businesses to remain competitive and leverage the full potential of the digital landscape.

Other emerging theme is the impact of the sustainable development on creative businesses in the digital age. Articles by (Yao et al., 2023 and X. Zhang et al., 2022) which investigate how the digital economy influences the sustainability practices within the creative sector, as both studies highlight the multifaceted contributions of the cultural industry through cultural preservation using technology and economic development. Since, the creative industry's emphasis on innovation, driven by a combination of technical expertise, creative talent, and human capital, which provides a favorable innovation for the industry's development (Zhao et al., 2024).

Furthermore, the theme of key capabilities of industry 4.0 also emerged as represented by (Jahromi & Ghazinoory, 2023) and (Rayna & Striukova, 2021) as they investigate the capabilities needed for industry 4.0 such as automation, data analytics, artificial intelligence (AI). These technologies have the potential to revolutionize creative workflows. However, integrating these technologies will likely require creative businesses to invest in new resources, such training programs for within business team and infrastructure upgrades. Lastly is the impact of digital tools on creative businesses (Fauchart et al., 2022; Fernandez-Lores et al., 2022; L. Zhang et al., 2023) investigate the influence of various digital tools. These tools can enhance creative processes, improve collaboration, etc. Understanding the benefits and drawbacks of digital tools is essential for creative businesses to optimize their resource allocation.

Table 2: Research objectives from sample articles

Research Objectives	Sample Articles
Digital transformation	(Burnes & Choi, 2021; Gornostaeva, 2023; Imawan et al., 2023; Kefi et al., 2024; J. Li, 2022; Raimo et al., 2022)
Impact of sustainable development	(Yao et al., 2023; X. Zhang et al., 2022)
Key capabilities of industry 4.0	(Jahromi & Ghazinoory, 2023; Rayna & Striukova, 2021)
Impact of digital tools	(Fauchart et al., 2022; Fernandez-Lores et al., 2022; L. Zhang et al., 2023)

The analysis of research objectives highlights a strong emphasis on the interplay between the creative industries and the digital economy. Digital transformation, sustainability, and the adoption of Industry 4.0 technologies emerged as key areas of interest. These findings underscore the growing recognition of the digital economy's influence on the creative sector and the need for the innovative strategies to navigate this evolving landscape.

3.3 Theories used

This study also explores the theoretical perspectives that previous scholars have used to examine the evolving resource configuration of creative businesses, from which inform to understand resource allocation and management within the creative sectors. Used and gratification theory posits that individual use media to fulfill specific needs and gratification, in this research context this theory might be applied to understand how creative businesses utilize digital technologies to satisfy the needs and desires of their targeted market (Kefi et al., 2024; J. Li, 2022). The second theory is resource-based view (RBV) that suggests a firm's competitive advantage embedded in its unique and valuable resources (Barney, 1991). RBV could be applied to identify, develop, and utilize creative businesses core resources (Landoni et al., 2020; L. Zhang et al., 2023). Rooted from RBV—dynamic capabilities extend it by emphasizing more the ability of firms to adapt, integrate, and reconfigure resources to survive in changing environment (Teece, 2010), dynamic capabilities help creative businesses to navigate the dynamic digital landscape such as by integrating new digital technologies, respond to evolving customer preferences, while maintaining competitive edge (Gornostaeva, 2023; X. Zhang et al., 2022). The last theories emerged is creative industry value chain (Alexandri et al., 2019; Jahromi & Ghazinoory, 2023) by outlining the stages involved in the creation and delivery of creative goods and services which helps to analyze how the digital economy is transforming different stages of the creative processes that comprise creation, production, distribution, retail and consumption (Bhatiasevi & Dutot, 2014; Horng et al., 2016).

Table 3: Theories used from sample articles

Theories Used	Sample Articles
Used and gratification Theory	(Kefi et al., 2024; J. Li, 2022)
Dynamic capabilities	(Gornostaeva, 2023; X. Zhang et al., 2022)
Resource-based view	(Landoni et al., 2020; L. Zhang et al., 2023)
Creative industry value chain	(Alexandri et al., 2019; Jahromi & Ghazinoory, 2023)

Theories underpinning the creative industries primarily focuses on organization, with a particular emphasis on resource-based view and dynamic capabilities. While a variety of theories were employed, studies predominantly lean towards understanding how organizations utilize resources within creative value chain. These theories help to explore the role of creativity, innovation, and strategic management in navigating the complex landscape of the digital economy.

3.4 Types of resources used within creative businesses

Resources are assets or inputs to production that an organization owns or accesses (Helfat & Peteraf, 2003), while capabilities refer the ability to utilize resources to achieve organizational goals (Helfat, 2002; Katila & Shane, 2005). Therefore, resources are important for firm's strategic decisions regarding which resources to further develop. Based on our literature review borrowed from (Barney, 1991; Hall, 1992; Karia & Wong, 2013), we identified two resources: tangible resources or physical resources that take form of specialized equipment and physical tools that are used to speed up production and cost advantage. In addition, according to (Barney, 1991) financial resources are included to the physical resources since the they become the firm's capacity to borrow and ability to generate funds through internal operations as highlighted by (Novani et al., 2022; Xi et al., 2022; Yao et al., 2023; X. Zhang et al., 2022), and technology resources (Alexandri et al., 2019; Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Hsu et al., 2023; Imawan et al., 2023; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Kwon et al., 2022; J. Li, 2022; Rayna & Striukova, 2021; Yao et al., 2023; L. Zhang et al., 2023).

Followed by intangible resources include management expertise resources (Fauchart et al., 2022; Gornostaeva, 2023; Ji et al., 2022; J. Li, 2022; Matiza, 2020; Novani et al., 2022; Purbasari et al., 2020; Rayna & Striukova,

2021; Xi et al., 2022; Yao et al., 2023; L. Zhang et al., 2023; X. Zhang et al., 2022)—the ability to acquire resources to achieve firm’s objectives, relational resources (Chen et al., 2022; Hsu et al., 2023) that provide economic value to firm through relationships with customers and suppliers, and organizational resources (Hsu et al., 2023; Landoni et al., 2020; X. Zhang et al., 2022) that helps firms to execute and implement strategies to meet customer requirements, and leads to sustainable competitive advantage (Karia & Wong, 2013).

Table 4: Creative business’ types of resources from sample articles

Types of resources		Sample Articles
Tangible resources	Intangible resources	
Financial resources		(Novani et al., 2022; Xi et al., 2022; Yao et al., 2023; X. Zhang et al., 2022)
Technology resources (social media, digital platforms, big data, AI, cloud computing, 3D printing, laser cut, CNC, website, 3D modelling applications, Virtual Reality)		(Alexandri et al., 2019; Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Hsu et al., 2023; Imawan et al., 2023; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Kwon et al., 2022; J. Li, 2022; Rayna & Striukova, 2021; Yao et al., 2023; L. Zhang et al., 2023)
	Management expertise resources	(Fauchart et al., 2022; Gornostaeva, 2023; Ji et al., 2022; J. Li, 2022; Matiza, 2020; Novani et al., 2022; Purbasari et al., 2020; Rayna & Striukova, 2021; Xi et al., 2022; Yao et al., 2023; L. Zhang et al., 2023; X. Zhang et al., 2022)
	Relational resources	(Chen et al., 2022; Hsu et al., 2023)
	Organizational resources	(Hsu et al., 2023; Landoni et al., 2020; X. Zhang et al., 2022)

The findings of this study indicate that the type of resources possessed by creative businesses allow them to focus on key factors in order to participate in the digital economy. The study highlights a greater emphasis on intangible resources for creative businesses although they still require strong foundation of tangible resources. However, creative businesses need a strategic combination of both tangible and intangible resources to adapt with digital economy. For instance, financial and technology are both essential resources, but they might not suffice. Therefore, to navigate the complexities and opportunities presented by the digital economy, it is necessary to balance with strong management expertise, foster relational resources, and develop a supportive organizational culture as well.

3.5 Challenges and opportunities faced by creative businesses

The sample articles highlight several challenges and opportunities encountered by creative businesses to navigate the digital economy. *Technical challenges* that hinder the digital adoption such as integrating new technologies into existing workflows, therefore creative businesses may require additional resources and expertise to overcome these technical hurdles (Chen et al., 2022; Gornostaeva, 2023; Yao et al., 2023; X. Zhang et al., 2022). *Lack of personnel or talent* as highlighted by (Fernandez-Lores et al., 2022; J. Li, 2022; Novani et al., 2022; Xi et al., 2022; X. Zhang et al., 2022) wherein creative businesses lack of qualified human resources with the necessary skills to meet the firms’ needs, both creative disciplines and digital technologies. Since this skills gap can impede their ability to fully leverage the potential of the digital economy. *Lack of financial resources* also emerged as underlined by (Novani et al., 2022; Purbasari et al., 2020; Raimo et al., 2022; Wang et al., 2023; X. Zhang et al., 2022), for instance investing in new technologies, upskilling the workforce can be costly for creative businesses hence this may restrict firms’ ability to fully participate in the digital economy. Lastly, *communication strategies*

also became crucial (Alexandri et al., 2019; Hsu et al., 2023; Kefi et al., 2024; Purbasari et al., 2020) since creative businesses need to develop strategies to communicate effectively with various stakeholders to ensure clear and consistent messaging.

Despite the challenges, these sample articles also identified numerous opportunities presented in the digital economy. *Enhanced learning and collaboration* allow creative businesses to facilitate communication and knowledge sharing between stakeholders, which later foster innovation and the creation of new ideas, particularly by optimizing digital tools and platforms (Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Fernandez-Lores et al., 2022; Hsu et al., 2023; Kefi et al., 2024; Raimo et al., 2022; Rayna & Striukova, 2021; L. Zhang et al., 2023). *Reaching new markets or customers* emphasize the opportunities to reach wider market or customer base through digital channels such as social media platforms, online marketplaces, etc to connect with potential customers, expanding their reach beyond geographic limitations (Burnes & Choi, 2021; Fernandez-Lores et al., 2022; Landoni et al., 2020; Matiza, 2020; Novani et al., 2022; Pang et al., 2022; X. Zhang et al., 2022). *Enhancing digital adoption* as highlighted by (Alexandri et al., 2019; Ji et al., 2022; J. Li, 2022; Rayna & Striukova, 2021; Wang et al., 2023; Yao et al., 2023), allows the opportunities to enhance digital adoption within creative businesses to improve efficiency, streamline workflows which later lead to increased productivity and competitiveness.

Table 5: Challenges and opportunities faced by creative businesses

Challenges	Sample Articles
Technical challenges	(Chen et al., 2022; Gornostaeva, 2023; Yao et al., 2023; X. Zhang et al., 2022)
Lack of personnel or talent	(Fernandez-Lores et al., 2022; J. Li, 2022; Novani et al., 2022; Xi et al., 2022; X. Zhang et al., 2022)
Lack of financial resources	(Novani et al., 2022; Purbasari et al., 2020; Raimo et al., 2022; Wang et al., 2023; X. Zhang et al., 2022)
Communication strategies	(Alexandri et al., 2019; Hsu et al., 2023; Kefi et al., 2024; Purbasari et al., 2020)
Opportunities	Sample Articles
Enhanced learning and collaboration	(Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Fernandez-Lores et al., 2022; Hsu et al., 2023; Kefi et al., 2024; Raimo et al., 2022; Rayna & Striukova, 2021; L. Zhang et al., 2023)
Reach wider market/customers	(Burnes & Choi, 2021; Fernandez-Lores et al., 2022; Landoni et al., 2020; Matiza, 2020; Novani et al., 2022; Pang et al., 2022; X. Zhang et al., 2022)
Enhancing digital adoption	(Alexandri et al., 2019; Ji et al., 2022; J. Li, 2022; Rayna & Striukova, 2021; Wang et al., 2023; Yao et al., 2023)

3.6 Impact of digital economy on creative businesses' resources allocation strategies

This study explores how the digital economy is affecting the resources allocation of creative businesses. Key findings reveal three primary areas of impact: an increased reliance on digital resources, the importance of collaboration and resource sharing, and the need for evolving resource management practices. *Increased reliance on digital resources* emphasizes the growing importance of digital technologies for creative businesses to create, produce, distribute, and market their creative products and services to be utilized effectively (Burnes & Choi, 2021; Gornostaeva, 2023; Imawan et al., 2023; Kefi et al., 2024; J. Li, 2022). *Collaborating and resource sharing* underlines the importance of to foster opportunities for creative businesses to collaborate with other organizations and shared resources which help them to overcome limitations and access a wider range of expertise, technologies, and markets (Alexandri et al., 2019; Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Novani et al., 2022; Rayna & Striukova, 2021; X. Zhang et al., 2022). Followed by *evolving resource management practices* that points out the need for new strategies to allocate resources effectively, manage digital assets and to create decision-making based on data (Chen et al., 2022;

Fauchart et al., 2022; Imawan et al., 2023; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Raimo et al., 2022; Rayna & Striukova, 2021; L. Zhang et al., 2023).

Therefore, the inferences about the impact of digital economy on resources highlight that creative businesses need to develop a strategic approach to resource management by prioritizing investments in digital technologies, building partnerships for resource sharing and collaboration. In addition to the possession of intangible resources for creative businesses, as well as the importance of adaptability and continuous learning so they are willing to learn new skills and adopt new technologies to remain competitive among other businesses. This can be inferred that these studies focused more on exploring the importance of resource management and its impact on the resource allocation.

Table 5: Impact of digital economy on creative businesses' resources

Impact of DE on resources	Sample Articles
Increased reliance of digital resources	(Burnes & Choi, 2021; Gornostaeva, 2023; Imawan et al., 2023; Kefi et al., 2024; J. Li, 2022)
Collaboration and resource sharing	(Alexandri et al., 2019; Burnes & Choi, 2021; Chen et al., 2022; Fauchart et al., 2022; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Novani et al., 2022; Rayna & Striukova, 2021; X. Zhang et al., 2022)
Evolving resource management practices	(Chen et al., 2022; Fauchart et al., 2022; Imawan et al., 2023; Jahromi & Ghazinoory, 2023; Kefi et al., 2024; Raimo et al., 2022; Rayna & Striukova, 2021; L. Zhang et al., 2023)

4. Conclusion

This SLR paper delves deeper into how the digital economy is transforming the resource configuration of creative businesses. By analyzing precedent studies, the review explores the profound impact of the digital economy on the resource allocation. The findings illuminate the complex interplay of resources within creative businesses in the context of the digital economy. The analysis reveals that the creative industries (CI) are predominantly composed of small medium-sized enterprises (SMEs) which are the focus of this study due to their pivotal role in driving innovation and economic growth within the creative industries, with a research focus on specific subsectors such as games, animation, and fashion. The research area highlights emerging themes of digital transformation, sustainability, and the adoption of industry 4.0 technologies reflecting the growing recognition of the digital economy's influence on the creative businesses and the need for the innovative strategies. In the context of resource management, a variety of theories have been utilized, including Used and Gratification Theory, Dynamic Capabilities, Resource-based View, and Creative Industry Value Chain.

In terms of the resources possessed by creative businesses, the findings revealed greater emphasis on intangible resources compared to tangible resources, along with its impact on the resource allocation. Furthermore, a notable finding is that creative businesses require a strategic combination of both tangible and intangible resources. Unlike other industries, the creative sector's reliance on human capital and creativity necessitates a unique resource configuration. This unique resource profile entails a strategic approach that balances tangible and intangible resources to foster innovation, competitiveness, and sustainability. This includes balancing financial and technological capabilities with strong management expertise, fostering collaboration with stakeholders, and establishing a supportive organizational culture within the team.

The results of this study show that the digital economy has affected the opportunities and challenges facing creative businesses. Challenges include integrating new technologies, lack of personnel or talent, insufficient financial resources, and communication strategies. Conversely, the digital economy also presents significant opportunities such as enhanced learning and collaboration, the ability to reach wider market or customers, and enhancing digital adoption. Therefore, by understanding these two factors, creative businesses that focus more on the human capital, creativity and intellectual property—can develop strategic resource allocation approaches. This includes

optimizing digital technologies, building collaborations, and fostering a continuous learning culture within the team to address gaps and bridge resource limitations that hinder business operations. Lastly, the study also investigates the impact of the digital economy on resource allocation. The findings emphasize (1) the growing importance of digital resources for creative businesses; as well as (2) collaboration and resource sharing with other firms to access wider expertise, and markets. As a result, creative businesses need to adapt their resource allocation strategies and leverage collaboration to fully realize the value of their resources and remain competitive.

This systematic literature review research article contributes to understanding of the dynamic landscape between creative business and the digital economy by providing a comprehensive systematic review analysis of how the digital economy impacts resource allocation to these businesses. Building on this study, we elaborate a future research agenda that proposes to pave way for further exploration of specific resource needs, collaboration models, and resource management practices to empower the creative businesses in the digital era.

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Re-examining the Link Between Economic Growth and Income Inequality in Sub-Saharan African Countries: Do Natural Resource Endowments Matter?

Mohamadou Oumarou¹, Oumarou Sali², Alioum Hamadou³

¹ Department of Public Economics, Faculty of Economics and Management, The University of Garoua, Garoua, Cameroon

² Faculty of Economics and Management, The University of Yaounde-II, Yaounde, Cameroon

³ The Advanced School of Economics and Business, The University of Garoua, Garoua, Cameroon

Correspondence: Mohamadou Oumarou, Department of Public Economics, Faculty of Economics and Management, The University of Garoua, Garoua, Cameroon. E-mail: cazanier95@gmail.com

Abstract

Do natural resource endowments influence the relationship between economic growth and income inequality in Sub-Saharan African (SSA) countries? This is the main question of this article. To this end, we use polynomial non-linear modeling and non-parametric and semi-parametric modeling applied to a panel of 43 SSA countries between 2000 and 2020. The data used come from World Development Indicators (WDI) and the University of Texas Inequality Project. In order to enrich the empirical literature on the subject, four indices measure income inequality in the econometric tests. All other things being equal, the results show that the growth-inequality link is non-linear, with a positive trend that changes convexity with the level of growth. Rents from non-renewable natural resources (oil, gas and other minerals) accentuate the negative effect of growth on inequality, while income from renewable resources (water and forests) has the effect of reducing inequality. Furthermore, these results show that rents from a single product (a single natural resource) have no impact on inequality. On the other hand, income from the export of several natural resources accentuates the effect of growth on inequality. Consequently, SSA countries need to put in place a general policy to reduce inequalities and a strategy to reduce their dependence on the exploitation of natural resources. This can be achieved through the structural transformation of economies and the development of global value chains.

Keywords: Economic Growth, Income Inequality, Natural Resource Endowments, Sub-Saharan Africa

1. Introduction

1.1. Growth and inequality dynamics in developed and developing countries

The global financial crisis and the recent COVID-19 pandemic have devastated the majority of countries, leading to an increase in income inequality accompanied by a drastic decline in economic growth. As a result, there has been renewed interest in the relationship between poverty, inequality and economic growth (Mary et al. 2023). Income disparity while ensuring higher economic growth is at the heart of the equity exchange shaping policy

discussions worldwide (Acheampong et al. 2023; De Dominicis et al. 2008). Furthermore, reducing income inequality and environmental fragility are important factors that can contribute to achieving sustainable development (Khan et al. 2023). Consequently, policies aimed at reducing income inequality, improving the equitable distribution of income and reducing relative poverty rates can help stimulate more inclusive and sustainable economic growth (Iwan et al. 2024).

The issue of inequality is not new to economic literature. It dates back to the pioneering work of Simon Kuznets (1955) and Kaldor (1956). However, their economic, social and political weight has increased markedly in recent years with the rapid growth of globalization. Stiglitz (2012) notes that in the United States, income inequality has returned to the record levels of the 1920s. The richest 1% captured over 65% of the increase in national income between 2002 and 2007.

Reading Piketty (2013), one would be tempted to conclude that the world has never been so unequal since the 18th century. Alvaredo et al. (2018) provided a comprehensive review of income inequality over the 40 years and highlighted a rise in income inequality in China, Russia and India. These alarming voices from researchers and international organizations warn of the damaging consequences of inequality on the macroeconomic and financial stability of developed countries, and on the economic and social development prospects of southern countries such as those in SSA. Furthermore, inequality has been a major challenge in SSA, mainly because several countries in the sub-region have not benefited from increased economic growth over the past 20 years (Menyelim et al. 2021). However, existing work in this dynamic is inconclusive on the variables that determine the link between growth and income inequality. Thus, the relationship between income inequality and economic growth remains an ongoing theme in both theoretical and empirical literature, and continues to enrich research in development economics.

1.2. The importance of natural resource endowments in SSA countries

SSA is endowed with an enormous abundance of natural resources. It has arable land and subsoil for agricultural activities, large-scale forests for timber production and abundant sources of energy such as gas, oil and other minerals. However, despite high rates of economic growth since the early 2000s, SSA's socio-economic performance lags behind that of developing countries in Asia. SSA is struggling to significantly reduce inequality and poverty, the two main targets of the African Union's Sustainable Development Agenda and Agenda 2063. Six of the world's ten most unequal countries are located there, and nine out of the world's ten poorest countries in terms of GDP per capita belong to it (World Bank, 2019). Africa ranks second after the Near and Middle East in terms of the benefits derived from natural resources, with 12.19% of GDP, including 9.25% for SSA (Table 1).

Table 1: Total benefits from natural resources as a % of GDP

regions of the world	average	weighted average
Africa	12,19	11,30
SSA	9,25	8,39
Central and South America	5,77	3,93
North America	1,69	1,18
eastern Asia	4,71	1,95
Area of the former USSR	7,26	9,91
Europe	0,68	0,37
Oceania	10,03	9,69
Near and Middle East	12,85	9,34

Source: Author, based on World Bank data (2021)

This table highlights the presumed role of natural resource endowments in the growth-income inequality relationship in SSA countries. In other words, it compares the simultaneous evolution of these two variables in resource-rich and resource-poor countries, and distinguishes the particular case of oil-exporting countries from that of countries exporting other minerals.

2. Literature Review

2.1. Growth and income inequality: a review of the theoretical literature

The theoretical literature on the relationship between growth and income inequality shows that there is a positive link and a negative one, which is evidenced through several channels of transmission.

2.1.1. Growth and income inequality: a positive relationship

This positive relationship between growth and income inequality is demonstrated by the inverted U-shaped Kuznets curve and by the channels of savings and investment, incentives and trickle-down theory. Firstly, the relationship between an inequality indicator such as the GINI coefficient and the level of gross domestic product is described by a curve, the inverted-U Kuznets curve. According to Kuznets (1955), inequality increases in the early stages of development, before economic structures are sufficiently solid, and decreases as the economy becomes more developed. Inequality increases until a critical point is reached, where the country experiences a certain level of average income, associated with high income inequality.

Secondly, in a full-employment model, since the richest people have a higher proportion of savings, an increase in inequality and in the richest people's share of national income increases, all other things being equal, savings and consequently investment and growth (Kaldor, 1955). But for this channel to work, (1) the increase in the income of the wealthiest must not be accompanied by an equivalent fall in their savings, (2) the increase in savings must translate into an increase in productive investment, and (3) the increase in investment must translate into an increase in growth (and not just more capital-intensive growth).

And thirdly, inequality can increase growth by providing incentives for effort, innovation and entrepreneurship. Despite the fact that some authors consider Stiglitz's (2012) argument to be "qualified as a moral fable", for authors such as Ostry et al. (2014), a lower level of income inequality is robustly correlated with faster and sustainable growth for a given level of redistribution.

2.1.2. Growth and income inequality: the hypothesis of a negative relationship

The hypothesis of a negative relationship between the unequal distribution of resources and economic development can be seen through three channels. We will discuss in turn the political economy channel, the social cohesion or political instability channel, and the credit market imperfections channel. For Alesina & Perotti (1996), inequality produces socio-political instability that threatens property rights. Barro (2000) stresses that redistribution reduces crime and anti-social activity.

Another theoretical channel is that of under-investment linked to capital market imperfections. According to Piketty (1997), the initial distribution of wealth affects the equilibrium interest rate in the presence of credit market imperfections. If wealth is very unevenly distributed, demand for capital will be greater than supply, and the interest rate will be higher. From the above, we note that the literature on the growth-income inequality relationship highlights a theoretical controversy.

2.2. Growth and inequality: controversial results in the empirical literature

Since the 2010s, recent studies have once again contradicted this positive relationship. Empirical studies have been the most abundant and the results the most controversial. For example, Marrero & Servén (2022) revealed that the impact of economic growth on inequality can be positive or negative. On the other hand, there is no strong relationship between income inequality and growth (Gao & Fan, 2023). Brueckner & Lederman (2018) concluded that inequality hinders growth in high-income countries. Madsen et al. (2018) found that inequality hinders growth at low levels of financial development. Hailemariam & Dzhumashev (2020) conclude that low levels of inequality can have a positive effect on growth. However, they can be grouped into consensual, alternative and skeptical approaches.

2.2.1. Inequality reduces growth: the consensus approach

Inequality negatively affects growth (Table 2).

Table 2: Inequality negatively affects growth

Authors	Country/Period	Measure of income inequality.	estimation methods used	results
Royuela et al. (2019)	15 OECD countries, 2003-2013	Gini coefficient	Pooled OLS RE IV	-
Cingano (2014)	OECD countries, 1980-2012	Gini coefficient	GMM	-
Lyke & Ho(2017)	Italy, 1967-2012	Gini coefficient	ARDL	-
Braun et al. (2019)	150 countries, 1978-2012	Gini coefficient	- pooled OLS - Dynamic panel	-
Royuela et al. (2019)	15 OECD countries, 2003-2013	Gini coefficient	Pooled OLS RE and IV	-
Breunig & Majeedc(2020)	152 countries, 1956-2011	Gini coefficient	GMM	-
Malinen (2008)	60 countries, 1971–2000	Gini Index	Panel dynamic OLS Panel dynamic SUR	-

Source: author's compilation. Note: - indicates a negative value.

2.2.2. Inequality contributes to higher growth: the alternative thesis

A number of studies have concluded that inequality has a positive impact on growth (Table 3).

Table 3: Inequality has a positive impact on growth

Authors	Country/Period	Measure of income inequality.	estimation methods used	results
Forbes (2000)	45 middle and high-income countries, 1966-1995	Gini coefficient	GMM first difference	+
Rangel et al. (2002)	Brazil, 1991-2000	Gini coefficient	Various estimated regressions	+
Shahbaz (2010)	Pakistan, 1971-2005	Gini coefficient	ARDL	+
Majeed (2016)	Pakistan, 1975-2013	Gini coefficient	ARDL	+
Scholl & Klasen (2019)	122 countries, 1961-2012	Gini coefficient	FE GMM and IV	+

Source: author's compilation. Note: + indicates a positive value.

2.2.3. The skeptical thesis: the growth-inequality relationship is non-existent

Some studies conclude that the relationship between inequality and growth is ambiguous.

Table 4: The non-existence of a stable relationship between inequality and growth

Authors	Country/Period	Measure of income inequality.	estimation methods used	results
Halter et al. (2014)	106 countries, 1965-2005	Gini coefficient	System GMM First-difference GMM	short term + long term -
Ostry et al. (2014)	90 countries, 1960-2010	Gini coefficient	System GMM	Early stage + stage of maturity -

Brueckner & Lederman (2018)	144 countries, 1970-2010	Gini coefficient	2SLS GMM	Middle-income countries + high-income countries -
Niyinbamira (2017)	Mpumalanga (18 municipalities), 1996-2014	Gini coefficient	FE Pooled regression	0
Benos & Laragiannis (2018)	Data at the level of the American states, 1929-2013	Gini coefficient	2SLS GMM	0
Gao & Fan, (2023)	Belt and Road Initiative countries 1999-2018	Gini coefficient	GMM in two steps	0

Source : compilation de l'auteur. Note: - denotes negative; + denotes positive; 0 denotes no relationship.

3. Methodology

We will present a methodology based on two (02) stages: Firstly, we use parametric and semi-parametric models. Before doing so, however, it is important to carry out a critical analysis of income inequality measures in order to select the most appropriate indicators for the context of the study (geographical setting and data constraints).

3.1. Critical analysis and choice of income inequality indicators

A wide variety of measures can be used to account for income distribution.

3.1.1. The inter-decile ratio

This ratio establishes the link between the 9th decile and the first income decile. The first decile defines the 10% of households with the highest incomes, and the 9th the 90% of households with the lowest incomes. This is the ratio of decile limits. This indicator has the merit of clarity, but does not reflect inequality in the income distribution as a whole.

3.1.2. The GINI index

This indicator is designed to summarize the Lorenz curve, which is defined on the x-axis by the percentage of households with the lowest incomes, and on the y-axis by the mass of income shared by these households. The GINI index is equal to 2 times the area bounded by the Lorenz curve and the first bisector. By construction, the GINI index lies between 0 (uniform distribution: all households have the same income) and 1 (distribution where all households except one have zero income). The closer the GINI index is to 1, the greater the inequality measured.

$$\mathbf{G}(\mathbf{x}) = \frac{2}{\bar{x}n^2} \sum_i (\bar{x} - \sum_{i=0} \bar{x}_i) \quad (1)$$

A second formulation of the index corresponds to an indicator of satisfaction: here, it is a linear social welfare function $U(x)$ assigning weights $(2n-1)$, $(2n-3)$, ..., 1 to individuals ranked in ascending order of welfare!

$$\mathbf{U}(\mathbf{x}) = \frac{1}{n^2} (\sum_i (2(\mathbf{n} - 1) + 1) \bar{x}_i) \quad (2)$$

From which we deduce :

$$\mathbf{G}(\mathbf{x}) = 1 - \frac{\mathbf{U}(\mathbf{x})}{\bar{x}} \quad (3)$$

Either again:

$$\mathbf{U}(\mathbf{x}) = \bar{x}[1 - \mathbf{G}(\mathbf{x})] \quad (4)$$

The social welfare indicator is therefore the average standard of living x corrected by the coefficient $1-G(x)$, which is between 0 and 1, and decreases when inequality increases.

3.1.3. The THEIL indicator

$$\mathbf{T}(\mathbf{x}) = \frac{1}{N} \sum_i \frac{x_i}{\bar{x}} \mathbf{Ln} \frac{x_i}{\bar{x}} \quad (5)$$

Inspired by the measure of entropy, the THEIL index measures the gap between the equal distribution.

3.1.4. The ATKINSON indicator ¹

These indices are defined by the value given to a parameter (e):

$$\mathbf{A}_e(\mathbf{x}) = \mathbf{1} - \frac{1}{\bar{x}} \left[\frac{1}{N} \sum (\mathbf{x}_i)^{1-e} \right]^{\frac{1}{1-e}} \quad (6)$$

For parameter (e) belonging to $[0, 1) \cup (1, \rightarrow]$

Et $\mathbf{A}_e(\mathbf{x}) = \mathbf{1} - \frac{1}{\bar{x}} [\pi_i x_i]^{\frac{1}{e}}$ for $e = 1$. Where x_i is the individual's income i ($i = 1, 2, \dots, N$) and \bar{x} is the average income. Each of these indices reflects the population's aversion to inequality: an Atkinson index worth $x\%$ means that the population would agree to lose $x\%$ of its current income so that the distribution becomes egalitarian. If $e = 0$ then the social utility function is simply the sum of the income.

3.1.5. The variance of logarithms

For income distributions that roughly follow a normal log distribution, this indicator seems to be appropriate. Like the Theil index, it can be broken down and allows for multi-criteria variance and regression analyses.

$$\mathbf{VL}(\mathbf{x}) = \frac{1}{n} \sum_i \left(\mathbf{Ln} x_i - \left(\frac{1}{n} \sum_i \mathbf{Ln} x_i \right) \right)^2 \quad (7)$$

3.1.6. The Palma index

The Palma ratio is defined as the share of national income held by the richest 10% divided by the share of the poorest 40%. This ratio is based on research that has shown that middle-class incomes (deciles 5 to 9) almost always represent half of gross national income, while the other half of income is distributed between the richest 10% and the poorest 40%, with the share of these two groups varying considerably from country to country (Palma, 2011).

In this work we will use the Gini coefficient, which is the most popular measure for capturing inequality, to which we compare the results of other indicators in order to enrich the empirical literature on income inequality in SSA.

3.2. Presentation of theoretical models

We will present the non-parametric and semi-parametric models in panel data, the linear polynomial model and finally the variables of the study.

3.2.1. Non-parametric and semi-parametric models in panel data

In this paper, we retain the non-parametric and semi-parametric specification of panel data proposed by Zhou & Li (2011) because it is best suited to the nature of our data (unrolled panel). We place in the general multi-variate case where z designates a vector of dimension 'p'. The formulation for the single-variate case is inferred by assuming "p=1". This more flexible methodological framework allows testing the non-linearity of the relationship

¹ The Atkinson index, named after Anthony ATKINSON, is an income inequality index based on the economic theory of well-being. It can be interpreted as follows: Let Y^* be the income which, if all individuals had this amount, would give the same level of social utility as the existing one (\bar{u}).

and evaluating the effect of natural resource endowments while benefiting from both the interest of panel data and the advantage of non-parametric and semi-parametric models.

$$y_{it} = g(z_{it}) + u_i + \varepsilon_{it} \quad t = 1, 2, \dots, m_i; \quad i = 1, 2, \dots, n. \quad (8)$$

$$y_{it} = g(z_{it}) + x'_{it}\gamma + u_i + \varepsilon_{it} \quad t = 1, 2, \dots, m_i; \quad i = 1, 2, \dots, n. \quad (9)$$

The specifications (8) and (9) represent respectively the non-parametric and semi-parametric models on fixed-effect panel data. We refer to the dependent variable as y and to the vector of explanatory variables as z where the link function $g(\cdot)$ that links the vector z with the variable y is an unspecified function to be estimated defined $\mathcal{R}^p \rightarrow \mathcal{R}$. For the case of semi-parametric model, « q » other control variables « x » are considered of which γ is a dimension vector « p » parameters to be estimated. We consider the case of an unrolled panel where each country « i » has half observations. The individual effects u_i are considered fixed and correlated with z and where the form of this correlation is unspecified. The error terms ε_{it} are assumed to be i.i.d, averaging zero and of equal variance σ_ε^2 where $E(\varepsilon_{it}/z_{it}) = 0$. Note that I_k is the matrix of identity dimension k and e_k is a unit vector $k \times 1$. If $\tilde{\varepsilon}_i = (\tilde{\varepsilon}_{i2}, \dots, \tilde{\varepsilon}_{imi})'$ where $\tilde{\varepsilon}_{it} = \varepsilon_{it} - \varepsilon_{i1}$, the covariance matrix of $\tilde{\varepsilon}_i$ « Σ_i » and its inverse « Σ_i^{-1} » can be expressed σ_ε^2 as follows:

$$\Sigma_i = \sigma_\varepsilon^2 (I_{m_i-1} + e_{m_i-1} e'_{m_i-1})$$

$$\Sigma_i^{-1} = \sigma_\varepsilon^2 (I_{m_i-1} - e_{m_i-1} e'_{m_i-1} / m_i) \quad (10)$$

If we note $g_{it} = g(z_{it})$, The model (1) becomes $y_{it} = g_{it} + u_i + \varepsilon_{it}$. In the event that « $t=1$ » we have $y_{i1} = g_{i1} + u_i + \varepsilon_{i1}$. If more is noted $\tilde{y}_i = (\tilde{y}_{i2}, \dots, \tilde{y}_{imi})'$ and $g_i = (g_{i2}, \dots, g_{imi})'$ where $\tilde{y}_{it} = y_{it} - y_{i1}$, can be expressed $\tilde{\varepsilon}_i$ depending on \tilde{y}_i , g_i and g_{i1} as follows :

$$y_{it} = g(z_{it}) + u_i + \varepsilon_{it} = g_{it} + u_i + \varepsilon_{it}$$

$$\tilde{y}_{it} + y_{it} = g_{it} + u_i + \tilde{\varepsilon}_{it} + \varepsilon_{it}$$

$$\tilde{y}_{it} = g_{it} - u_i + \tilde{\varepsilon}_{it} + \varepsilon_{it}$$

$$\tilde{y}_{it} = g_{it} - g_{i1} + \tilde{\varepsilon}_{it}$$

$$\tilde{y}_i = g_i - g_{i1} + e_{m_i-1} + \tilde{\varepsilon}_i$$

from where $\tilde{\varepsilon}_i = \tilde{y}_i - g_i + g_{i1} e_{m_i-1}$ (11)

Thus, individual likelihood can be developed from the formulation of $(\tilde{\varepsilon}_i)$ as follows:

$$L_i(\cdot) = -\frac{1}{2} \tilde{\varepsilon}_i' \Sigma_i^{-1} \tilde{\varepsilon}_i, \quad i = 1, 2, \dots, n.$$

$$L_i(\cdot) = -\frac{1}{2} (\tilde{y}_i - g_i + g_{i1} e_{m_i-1})' \Sigma_i^{-1} (\tilde{y}_i - g_i + g_{i1} e_{m_i-1}), \quad i = 1, 2, \dots, n.$$

$$L_{it}^g = \frac{\partial L_i(\cdot)}{\partial g_{it}} = \begin{cases} -e'_{m_i-1} \Sigma_i^{-1} (\tilde{y}_i - g_i + g_{i1} e_{m_i-1}), & t = 1 \\ c'_{i,t-1} \Sigma_i^{-1} (\tilde{y}_i - g_i + g_{i1} e_{m_i-1}), & t \geq 2 \end{cases} \quad (12)$$

Where $c'_{i,t-1}$ is a dimension vector $(m_i - 1) \times 1$ whose all elements are null except the $(t - 1)^{eme}$ element which is equal to 1. If one defines $\begin{pmatrix} \alpha_0 \\ \alpha_1 \end{pmatrix} = \begin{pmatrix} g(z) \\ \partial g(z)/\partial z \end{pmatrix} = \begin{pmatrix} g(z) \\ g^1(z) \end{pmatrix}$ and $G_{it} = \begin{pmatrix} 1 \\ (z_{it} - z)/h \end{pmatrix}$. The estimation of $\begin{pmatrix} \alpha_0 \\ \alpha_1 \end{pmatrix}$ is done by solving the first order condition of the profiled likelihood in an iterative way as follows:

$$\sum_{i=1}^n \frac{1}{m_i} \sum_{t=1}^{m_i} K_h(z_{it} - z) G_{it} L_{it}^g(\hat{g}_{[l-1]}(z_{i1}), \dots, G_{it}(\alpha_0, \alpha_1)', \dots, \hat{g}_{[l-1]}(z_{imi})) = 0 \quad (13)$$

Where $\hat{g}_{[l-1]}(z_{is})$ is the estimate of $g(z_{is})$ for $(l - 1)^{eme}$ iteration and $k_h(v) = h^{-1}k(v/h)$ and $k(\cdot)$ is the kernel function. We can then define the estimate for the l 'st iteration according to the $(l - 1)^{eme}$ iteration:

$$\begin{pmatrix} \alpha_0 \\ \alpha_1 \end{pmatrix} = \begin{pmatrix} \hat{g}_{[l]}(z) \\ \hat{g}_{[l]}^1(z) \end{pmatrix} = \frac{(A_1 + A_2)}{A_3}$$
 such as:

$$\left\{ \begin{array}{l} \mathbf{A}_1 = \sum_{i=1}^n \frac{1}{\mathbf{m}_1} \left(\mathbf{e}'_{mi-1} \sum_i^{-1} \mathbf{e}_{mi-1} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{i1} \hat{\mathbf{g}}_{[l-1]}(\mathbf{z}_{i1}) + \sum_{t=2}^{m_i} \mathbf{c}'_{i,t-1} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{i1} \hat{\mathbf{g}}_{[l-1]}(\mathbf{z}_{i1}) \right) \\ \mathbf{A}_2 = \sum_{i=1}^n \frac{1}{\mathbf{m}_1} \left(\mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{i1} \mathbf{e}'_{mi-1} \sum_i^{-1} \mathbf{H}_{i,[l-1]} + \sum_{t=2}^{m_i} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{it} \mathbf{c}'_{i,t-1} \sum_i^{-1} \mathbf{H}_{i,[l-1]} \right) \\ \mathbf{A}_1 = \sum_{i=1}^n \frac{1}{\mathbf{m}_1} \left(\mathbf{e}'_{mi-1} \sum_i^{-1} \mathbf{e}_{mi-1} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{i1} \mathbf{G}'_{i1} + \sum_{t=2}^{m_i} \mathbf{c}'_{i,t-1} \sum_i^{-1} \mathbf{c}_{i,t-1} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) \mathbf{G}_{i1} \mathbf{G}'_{it} \right) \end{array} \right.$$

Where $\mathbf{H}_{i,[l-1]}$ is a dimension vector $(m_1 - 1) \times 1$ of which the elements noted « $h_{i,[l-1]}$ » are as $h_{i,[l-1]} = (\tilde{\mathbf{y}}_{it} - (\hat{\mathbf{g}}_{[l-1]}(\mathbf{z}_{it}) - \hat{\mathbf{g}}_{[l-1]}(\mathbf{z}_{it})))$, $t = 1, 2, \dots, m_i$. The initial estimator of $g(\cdot)$ is obtained based on the time series while the last iteration is selected when the convergence criterion is checked:

$$\sum_{i=1}^n \frac{1}{m_i} \sum_{t=2}^{m_i} (\hat{\mathbf{g}}_{[1]}(\mathbf{z}_{it}) - \hat{\mathbf{g}}_{[1]}(\mathbf{z}_{it}))^2 / \sum_{i=1}^n \frac{1}{m_i} \sum_{t=2}^{m_i} \hat{\mathbf{g}}_{[l-1]}^2(\mathbf{z}_{it}) \leq \mathbf{0.01} \quad (14)$$

In addition, the variance σ_ε^2 is estimated by:

$$\sigma_\varepsilon^2 = \frac{1}{2n} \sum_{i=1}^n \frac{1}{m_i-1} \sum_{t=2}^{m_i} (\mathbf{y}_{it} - \mathbf{y}_{i1} - (\hat{\mathbf{g}}_{[1]}(\mathbf{z}_{it}) - \hat{\mathbf{g}}_{[l-1]}(\mathbf{z}_{it})))^2 \quad (15)$$

The variance of the estimator $\hat{\mathbf{g}}(\mathbf{z})$ is calculated by: $k(\mathbf{nh}\hat{\Omega}(\mathbf{z}))^{-1}$

where $k = \int k^2(\mathbf{v}) d\mathbf{v}$ and $\hat{\Omega}(\mathbf{z}) = \sum_{i=1}^n \frac{m_i-1}{m_i} \sum_{t=2}^{m_i} \mathbf{K}_h(\mathbf{z}_{i1} - \mathbf{z}) / \sigma_\varepsilon^2$

For the estimation of the semi-parametric model, the nonparametric estimator of the non-parametric estimator of the 'q' control variables $\hat{\mathbf{g}}_x(\cdot) = (\hat{\mathbf{g}}_{x,1}(\cdot), \dots, \hat{\mathbf{g}}_{x,q}(\cdot))'$ and the dependent variable $\hat{\mathbf{g}}_y(\cdot)$ defines the estimator is defined. Thus the estimate of γ which is of dimension $q \times 1$ is:

$$\hat{\boldsymbol{\gamma}} = \left(\sum_{i=1}^n \frac{\tilde{\mathbf{x}}_i \Sigma_i^{-1} \tilde{\mathbf{x}}_i'}{m_i} \right)^{-1} \left(\sum_{i=1}^n \frac{\tilde{\mathbf{x}}_i \Sigma_i^{-1} \tilde{\mathbf{y}}_i'}{m_i} \right) \quad (16)$$

Where $\tilde{\mathbf{x}}_i$ and $\tilde{\mathbf{y}}_i$ are respectively dimension matrices $(m_i - 1) \times q$ and $(m_i - 1) \times 1$ such that the second line is defined by: $\tilde{\mathbf{x}}_{it} = \tilde{\mathbf{x}}_{it} - (\hat{\mathbf{g}}_x(\mathbf{z}_{it}) - \hat{\mathbf{g}}_x(\mathbf{z}_{i1}))$ et $\tilde{\mathbf{y}}_{it} = \tilde{\mathbf{y}}_{it} - (\hat{\mathbf{g}}_y(\mathbf{z}_{it}) - \hat{\mathbf{g}}_y(\mathbf{z}_{i1}))$. The non-parametric component of the semi-parametric model is deduced by replacing $\tilde{\mathbf{y}}_{it}$ by $\tilde{\mathbf{y}}_{it} - \mathbf{x}'_{it} \hat{\boldsymbol{\gamma}}$.

3.3.2. Polynomial nonlinear model

In order to empirically verify the existence of a non-linear relationship between income inequality and economic growth, we first test a parametric model integrating powers of higher order than the base model {model (M1)}. This is equivalent to introducing a quadratic or cubic polynomial function of gross domestic product (GDP) which provides comprehensive information on the behaviour to be observed in relation to different levels of per capita GDP. We first propose to test a more complex nonlinear behavior that lends itself to an unambiguous interpretation of the form of the relation. This approach allows to capture the proper relation on a wide range of commonly recognized forms (U curve, inverted U curve, inverted N curve...).

The polynomial model of degree k as follows:

$$\left\{ \begin{array}{l} \mathbf{IncomeIneq}_{it} = \sum_{k=0}^{k+1} \beta_k (\mathbf{GDP}_{it})^k + \lambda \mathbf{X}_{it} + \mu_i + \varepsilon_{it} \\ \text{where } t = 2000, 2001, 2002, \dots, 2020, \quad i = 1, 2, \dots, 43 \end{array} \right. \quad (M_1)$$

We consider below three (03) parametric models derived from the polynomial model (M1) that we note models (1), (2) and (3). These models concern respectively the linear model taken as benchmark and the quadratic and cubic polynomial models.

$$\mathbf{IncomeIneq}_{it} = \beta_0 + \beta_1 \mathbf{GDP} + \lambda \mathbf{X}_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

$$IncomeIneqv_{it} = \beta_0 + \beta_1 GPD + \beta_2 GPD^2 + \lambda X_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

$$IncomeIneqv_{it} = \beta_0 + \beta_1 GPD + \beta_2 GPD^2 + \beta_3 GPD^3 + \lambda X_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

where $X_{it} = (Ts/Sup_{it}, Ts/Sec_{it}, FiDev_{it}, TradeOp_{it}, FDI_{it})$ and $t = 2000, 2001, \dots, 2020$; $i = 1, 2, 3, \dots, 43$

Where i represents a country and t indicates time; $IncomeIneq$ represents the income inequality captured by the Gini index, the Theil index, the Atkinson index or the Palma index; GPD is the gross domestic product per capita at the beginning of the reference period; Ts/sup , Higher education enrolment rate; Ts/sec , Secondary education enrolment rate; $FiDev$, financial development; $TradeOp$, commercial openness and FDI , foreign direct investment. The coefficients β_k are parameters to be estimated; μ_i are individual characteristics and ε_{it} stochastic errors.

3.2.3. Definition of study variables

This section presents the dependent variable and the explanatory variables used in this study.

Income inequality: To measure income inequality, we used mainly the GINI coefficient, as is the case for many authors (Hafezali et al. 2023; Menyelim et al. 2021), because it is a relative measure recommended by the European Union and Eurostat (Langel, 2012) and easy to interpret. This index varies between 0 and 1, i.e., the further it is from zero, the greater the inequality. This variable is obtained from the University of Texas Inequality Project.

There are two variables of interest: GPD/cap and natural resource endowments. The impact of natural resource endowments on the growth-income inequality relationship is measured by the interaction variable between growth and natural resource rent ($GDP/cap * Natural Resource Rent$). GDP/cap is the logarithm of GDP per capita in constant 2005 PPP \$ taken from WDI (2021). In line with recent work by Mignamissi & Kuete (2021), we use total resource rent as a percentage of GDP as a measure of natural resource endowments (Rents). This variable is obtained from the WDI (2021) database.

Trade openness: Does trade contribute to improving national well-being? Classical and neoclassical theory answers this question in the affirmative, but some authors, like Bhagwati (1958), speak of “impoverishing growth”. When a country opens up to the outside world, this tends to improve the nation's well-being, but the terms of trade may deteriorate to such an extent that they lead to a net decline in well-being. This variable is obtained from the WDI database (2021).

Financial development: The literature explains the effects of financial development on income inequality from models using educational investment and physical capital investment respectively. We follow Zakari & Tawiah (2019), Haseeb et al. (2018), Ali et al. (2019) in the use of domestic credit to the private sector in % of GDP as a proxy for financial development. This variable is obtained from the WDI (2021) database.

School enrolment (secondary and tertiary): Some authors express this in terms of years of schooling (Barro & Lee, 1996). Economic theory had long held that human capital positively affected growth, but other authors challenged this hypothesis in the 1990s (Pritchett, 2001). As in the case of certain authors such as Joseph & Woulkam (2018), we use the number of people enrolled in secondary and tertiary education as a percentage of the total number of people enrolled in school. This variable is obtained from the WDI (2021) database.

Foreign Direct Investment: The relationship between FDI and income inequality is often explained by neoclassical and dependency theories. FDI represents inward foreign direct investment as a percentage of GDP, as in Khan & Ozturk (2020). This variable is obtained from the WDI database (2021).

4. Results and Interpretations

Table 5 below presents the results of three parametric specifications applied to a panel of 43 SSA countries between 2000 and 2020. Columns (1, 4, 7 and 10) of Table 5 show the results of the reference linear model. The parameter β_1 is positive and significant for all four income inequality indices. This shows that economic growth is not distributive, or conversely, income redistribution does not facilitate economic growth.

The parameters λ_1 , λ_2 , λ_3 , λ_4 and λ_5 corresponding respectively to the five control variables (Higher education enrolment ratio, secondary education enrolment ratio, financial development, trade openness and foreign direct investment) are all statistically significant for at least one income inequality index. These results are in line with those obtained by Lemieux (2006) on the link between rising wage inequality and the profitability of higher education.

The positive and significant coefficient on financial development shows that in most SSA countries, the low level of financial inclusion and the limited diversity of financial institutions keep SMEs and small individual entrepreneurs unable to access the financing they need to develop their activities. Only large companies with collateral can access financing (Bassirou & Ramde, 2019). This may explain the rise in inequality. This result is similar to those obtained by Mansour & Wendel (2015). This result invalidates the hypothesis of Greenwood and Jovanovic (1990) and contrasts with those obtained by Jauch & Watzka (2015). The degree of openness of the economy has no effect on income inequality, as its coefficient appears insignificant for all four (04) income inequality indices. This result contradicts theory. These effects could lead to an increase in per capita income. This result contrasts with that obtained by El Ghak & Zarrouk (2010) and Boukhatem & Mokrani (2012).

The FDI result corroborates the neoclassical theory that FDI promotes economic growth and reduces inequality in recipient countries (Mundell, 1957). The latter assert that, as well as filling resource gaps, FDI promotes greater economic growth and development through technology diffusion, the development of human capital and management skills, and access to export markets (Li & Liu, 2004).

Columns (2, 5, 8 and 11) of Table 5 present the results of the quadratic polynomial model (Model 2) of the four (04) income inequality indices. The positive and significant coefficients of three indices highlight the existence of a “U”-shaped curve. Columns (3, 6, 9 and 12) of Table 5 present the results of the cubic polynomial models (model 3). Estimates of these models using the Gini index, the Theil index or the Palma index as measures of income inequality are still significant for the cubic specification, which implies that, for these three indices, the relationship is likely to withstand further non-linear adjustment. We also note that for all four inequality indices, the explanatory power is greater when the polynomial model is of higher degree. Thus, the “R² Within” of the quadratic model is higher than that of the linear model, and the “R² Within” of the cubic model is higher than that of the quadratic model.

Table 5: Fixed-effects parametric estimation of the linear, quadratic and cubic panel model for SSA countries

Dependent variables : Income inequality indices (Gini, Theil, Atkinson and Palma)												
explanatory variables	linear	quadratic	cubic	linear	Quadratic	Cubic	Linear	Quadratic	Cubic	Linear	Quadratic	Cubic
constant	(1) ^a 44,33 (129,89)***	(2) ^a 39,04 (70,87)***	(3) ^a 39,16 (70,83)***	(4) ^b 42,76 (36,74)***	(5) ^b 45,02 (122,02)***	(6) ^b 44,97 (121,9)***	(7) ^c 45,03 (291,4)***	(8) ^c 99,59 (0,000019)***	(9) ^c 39,99 (0,00001)***	(10) ^d 0,99 (0,004)***	(11) ^d 69,57 (139,8)***	(12) ^d 69,73 (139,5)***
GPD/cap	0,015 (1,64)**	-	-	0,188 (5,74)***	-	-	0,0011 (3,99)**	-	-	0,005 (2,5)*	-	-
(GDP /cap) ²	0,005 (2,49)**	0,045 (2,48)**	-	0,26 (1,54)*	0,026 (5,83)**	-	0,00012 (0,81)	0,009 (8,53)*	-	0,059 (2,35)**	0,005 (3,27)***	-
(GDP /cap) ³	-0,0056 (0,1)	0,0066 (2,49)**	-0,0058 (1,1)*	0,26 (7,7)***	0,0026 (1,54)	-0,0018 (1,48)***	-0,00012 (2,49)**	-0,00002 (1,81)	-0,0037 (7,7)	-0,057 (1,22)**	0,0056 (2,35)**	-0,0069 (2,49)**
Enrolment/ higher rate	0,035 (2,43)**	0,038 (1,00)	0,042 (1,10)	0,211 (4,21)***	0,12 (4,91)***	0,13 (5,00)***	0,0014 (3,87)***	0,0016 (4,39)***	0,0015 (4,29)***	0,014 (1,26)*	0,144 (4,12)***	0,146 (4,14)***
Enrolment/sec ondary rate	-0,0042 (0,74)	-0,098 (6,55)***	-0,096 (6,4)***	-0,0046 (0,24)	-0,015 (1,52)	-0,015 (1,53)	-0,0084 (5,95)***	-0,0088 (6,2)***	-0,0083 (6,15)***	-0,0059 (1,38)	-0,118 (8,71)***	-0,116 (8,54)***
Financial Development	0,062 (0,67)**	0,017 (0,87)*	0,017 (0,89)	0,081 (0,26)*	0,022 (1,72)	0,023 (1,78)*	0,0066 (3,53)***	0,064 (3,43)***	0,0065 (3,45)***	0,0041 (0,06)	0,023 (1,28)	0,022 (1,22)
Trade openness	0,0021 (0,15)	0,0011 (1,61)	0,0011 (1,64)	0,0043 (0,92)	0,0015 (0,34)	0,0015 (0,33)	0,0025 (0,4)	0,0018 (0,28)	0,0017 (0,27)	0,0048 (4,66)	0,0075 (1,22)	0,0077 (1,26)
FDI	-0,01 (1,21)*	-0,031 (0,81)**	-0,015 (0,38)	-0,014 (0,48)**	-0,059 (1,97)*	-0,057 (2,19)**	-0,0081 (2,28)**	-0,0055 (1,51)	-0,0066 (1,79)*	-0,0027 (0,41)	-0,053 (1,5)*	-0,042 (1,19)
Observations	903	903	903	903	903	903	903	903	903	903	903	903
Number of countries	43	43	43	43	43	43	43	43	43	43	43	43
R ² Within	0,30	0,31	0,33	0,51	0,55	0,57	0,13	0,12	0,18	0,47	0,39	0,49

Source: Author. Numbers in parentheses correspond to Student statistics ***, ** and * indicate that the variables are significant at 1%, 5% and 10% respectively. a Income Ineq corresponds to the Gini index of income, b Income Ineq corresponds to the Theil index of income, d

Income Ineq corresponds to the Atkinson index of order 1: $A(1)$ of income, c *Income Ineq* corresponds to the Palma index of income..

4.1. Modèles non-paramétrique et semi-paramétrique

The use of non-parametric or semi-parametric modeling is less restrictive, as it does not require a predetermined functional form. This approach makes it possible to fine-tune the relationship's point cloud while benefiting from smooth, flexible non-parametric functions instead of predefined polynomial functions.

We propose to study the relationship using non-parametric and semi-parametric models for panel data. Thus, if we replace the polynomial function $\sum_{k=0}^{k+1} \beta_k (GDP_{it})^k$ in the polynomial model (M1) by the function $g(GDP_{it})$ to be estimated, our model to be estimated becomes a semi-parametric model. Furthermore, when we eliminate the parametric part λX_{it} containing the other control variables, the model then becomes a non-parametric model. We thus note the following non-parametric (M2) and semi-parametric (M3) models:

$$\begin{cases} IncomeIneq_{it} = g(GDP_{it}) + \mu_i + \varepsilon_{it} \\ \text{where } t = 2000, 2001, 2002, \dots 2020, i = 1, 2, \dots 43 \end{cases} \quad (M_2)$$

$$\begin{cases} IncomeIneq_{it} = g(GDP_{it}) + \lambda X_{it} + \mu_i + \varepsilon_{it} \\ \text{where } t = 2000, 2001, 2002, \dots 2020, i = 1, 2, \dots 43 \end{cases} \quad (M_3)$$

Table 6 below shows the parameters of the control variables derived from the semi-parametric estimation {model (M3)}. The coefficients of these variables have the same signs as those obtained in the estimation of the linear parametric model. However, the coefficient of trade openness in this semi-parametric estimation is significant for the Gini index, and that of the tertiary enrolment ratio is not significant for this Gini index either. These results are in line with those found in the polynomial model.

Table 6: Results of the semi-parametric estimation of control variables (Model M 3)

explanatory variables	Dependent variables: Indices of income inequality			
	(1) ^a	(2) ^b	(3) ^c	(4) ^d
Higher education enrolment rate	0,041 (1,05)	0,11 (4,33) ^{***}	0,016 (4,55) ^{***}	0,13 (3,87) ^{***}
Secondary school enrolment rate	-0,09 (6,42) ^{***}	-0,001 (1,09)	-0,009 (6,32) ^{***}	-0,12 (8,77) ^{***}
Financial Development	0,019 (0,98) [*]	0,016 (1,22)	0,0059 (3,14) ^{***}	0,015 (0,82)
Trade openness	0,0011 (1,65) [*]	0,0016 (0,37)	0,0016 (0,25)	0,008 (1,31)
FDI	-0,007 (0,21) [*]	-0,031 (1,26) ^{**}	-0,0051 (1,45)	-0,035 (1,04)
Observations	903	903	903	903
number of countries	43	43	43	43
R ² Within	0,31	0,38	0,60	0,52

Source: Author. Notes: The numbers in brackets are for Student ^{***}, ^{**} and ^{*} statistics, indicating that the variables are significant at 1%, 5% and 10% respectively. *a* *Income_Ineq* corresponds to the Gini index of income, *b* *Income_Ineq* corresponds to the Theil index of income, *d* *Income_Ineq* corresponds to the Atkinson index of order 1: $A(1)$ of income, *c* *Income_Ineq* corresponds to the Palma index

4.2. Empirical evaluation of the effects of natural resource endowments on the relationship between growth and income inequality in SSA countries.

By introducing the interaction variable (GPD/cap*Rents from natural resources) into the semi-parametric model (M3) above, we highlight the effects of endowments in natural resources on the growth-income inequality relationship in SSA countries. Thus, the model (M3) becomes:

$$\left\{ \begin{array}{l} \text{IncomeIneqit} = g(\text{GDP}_{it}) * \text{Rentes}_{it} + \mu_i + \varepsilon_{it} \\ \text{where } t = 2000, 2001, 2002, \dots, 2020, \quad i = 1, 2, \dots, 43 \end{array} \right. \quad (\text{M}_4)$$

Table 7 below presents the results of the semi-parametric model (M4) estimation. Like the coefficient of the growth rate of GDP per capita in the previous models, the coefficient of the interaction variable (GPD*RENTS of the NRs) is positive and significant but a value lower than that obtained from the estimation of the linear model; This is evidence that rents from natural resources overall have a moderating effect on income inequality because the results of the previous linear model estimate show that an increase of 10 percentage points in per capita GDP is associated with an increase of 0,15 percentage points of the Gini index, 1.88 percentage points of the Theil index, 0.011 of the Atkinson index and 0.05 of the Palma index whereas this increase is only respectively (0.017), (0.24), (0.0011) and (0.007) for an increase of 10 percentage points in this same interaction variable (GDP/head*Natural resources rent). This suggests that total rents from renewable and non-renewable natural resources mitigate the negative impact of growth on income inequality. The results (table 7) highlight the effects of different types of natural resources. Higher education, financial development and trade opening increase income inequality while secondary school enrolment and FDI reduce income inequality.

Table 7: Results of the semi-parametric model estimation (M4) highlighting the effect of the importance or volume of natural resources

explanatory variables	Dependent variables: Indices of income inequality			
	Gini	Theil	Atkinson	Palma
Constante	44,37 (130,15)***	43,22 (36,6)***	0,99 (0,19)***	75,04 (292,16)
GPD/cap	0,015 (1,64)**	0,188 (5,74)***	0,0011 (3,99)**	0,005 (2,5)*
GPD / cap * Rents from RN	0,0017 (0,51)*	0,024 (1,96)***	0,00011 (0,7)	0,0007 (0,27)**
Higher education enrolment rate	0,034 (2,36)**	0,22 (4,31)***	0,015 (4,16)***	0,14 (1,34)
Secondary school enrolment rate	-0,0042 (0,75)*	-0,004 (0,22)	-0,0086 (6,06)***	-0,0058 (1,36)
Financial Development	0,0045 (0,49)*	0,012 (0,38)	0,0065 (3,47)***	0,0011 (0,17)
Trade openness	0,0033 (0,24)	0,0028 (0,61)*	0,0017 (0,27)	0,0048 (4,7)**
FDI	-0,0083 (0,94)*	-0,039 (1,29)**	-0,0068 (1,88)	-0,0014 (0,21)
Observations	903	903	903	903
Number of countries	43	43	43	43
R ² Within	0,78	0,48	0,52	0,29

Source : Author, Figures in brackets correspond to the statistics of Student ***, ** and * indicate that variables are significant at 1%, 5% and 10% respectively

Table 8 below presents the results of the breakdown of the natural resource endowment effect to highlight the impact of different types of natural resources. This suggests that the benefits from oil, gas and other minerals are accentuating the negative impact of growth on income inequality, confirming our first hypothesis.

Table 8: Highlighting the effects of different types of natural resources in the growth-income inequality relationship

explanatory variables	Dependent variables: Indices of income inequality			
	Gini	Theil	Atkinson	Palma
Constant	46,6 (5,11)***	44,4 (17,56)***	0,99 (0,27)***	78,03 (22,8)***
GPD/cap	0,072	0,11	0,0014	0,061

	(1,55)	(3,48) ^{***}	(3,11) ^{***}	(1,44)
GDP*Minerals	0,43 (9,83) ^{***}	0,058 (1,97) ^{**}	0,0017 (4,12) ^{***}	0,46 (11,68) ^{***}
GDP*Gas	0,33 (3,68) ^{***}	0,32 (1,33) [*]	0,037 (0,11)	0,18 (3,61) ^{***}
GDP*Oil	0,034 (1,49) [*]	0,042 (2,76) ^{***}	0,037 (1,68) [*]	0,002 (0,14)
GDP*Fresh water	-0,022 (5,11) ^{***}	-0,096 (0,32) ^{***}	-0,007 (1,77) ^{***}	-0,013 (3,47) ^{***}
GDP*Forest	-1,33 (5,6) ^{***}	-0,58 (2,97) ^{**}	-0,45 (5,21) [*]	-1,18 (4,78) ^{***}
Financial Development	0,0048 (0,41) [*]	0,015 (0,48)	0,0069 (4,47) ^{***}	0,0017 (0,27)
Trade openness	0,0039 (0,24) [*]	0,0018 (0,65)	0,0037 (0,29)	0,0043 (5,7) ^{***}
FDI	-0,0087 (0,94) [*]	-0,031 (1,59) ^{**}	-0,0068 (2,88)	-0,0017 (0,22)
Observation	840	840	840	840
Number of countries	40	40	40	40
R ² Within	0,38	0,22	0,40	0,27

Source : Author, Figures in brackets correspond to the statistics of Student ^{***}, ^{**} and ^{*} indicate that variables are significant at 1%, 5% and 10% respectively

However, the coefficients associated with the interaction variables (GDP*Freshwater) and (GDP*Forest) show negative and highly significant signs for all four income inequality indices; This suggests that the benefits of freshwater and forest are reducing the negative effects of growth on income inequality. This result justifies the first showing that rents moderate the negative effect of growth on income inequality because the second effect has outweighed the first, that is to say, the dominant positive effect of renewable resources (fresh water and forests) dissimilated the negative effect of non-renewable resources (minerals, gas and oil) hence the result of the estimation of our first interaction variable (GDP* Total Natural Resource Rents).

Table 9 below presents the results of highlighting the diversity effect of natural resources. We divided our sample into two (02) groups of countries according to the composition of their exports. On the one hand, we have countries for which exports consist of 75% of a single product (from a natural resource) and countries whose exports are composed of at least two (02) natural products or resources. According to the Statistics Division of the African Development Bank, our sample includes thirteen (13) SSA countries in the first category and thirty (30) countries in the second category. Thus, a country is considered as an exporter of a single product when the latter accounts for more than 75% of its exports and products are taken into account if they account for more than 4% of the total exports of the country. The coefficient associated with the interaction variable (GDP*Rent) of countries exporting a single product is not significant for the 04 indices of income inequality. This suggests that rents from a single natural resource do not have an impact on income inequality in SSA countries. On the other hand, the coefficient associated with the interaction variable (GDP*Rent) of countries exporting several products (from two) is positive and statistically significant for the three (03) indices of income inequality out of four (04) ; this shows that for countries exporting several natural resources, the resulting rents increase income inequality. It is also interesting to note that the coefficients associated with our control variables retain the expected signs.

Table 9: Highlighting the diversity effect of natural resources in the growth-income inequality relationship

explanatory variables	Dependent variables: Indices of income inequality			
	Gini	Theil	Atkinson	Palma
constant	43,13 (74,55)***	38,35 (21,02)***	0,99 (0,11)***	75,92 (71,54)***
GDP*Rents (Single product exporting countries)	0,011 (0,69)	0,079 (1,57)	0,013 (0,02)	0,009 (0,77)
GDP*Rents (Countries exporting more than one product)	0,02 (1,66)*	0,24 (5,82)***	0,016 (2,87)***	0,007 (0,76)
Higher education enrolment rate	0,025 (1,53)	0,065 (1,15)	0,004 (0,91)	0,007 (0,58)
Secondary school enrolment rate	-0,003 (0,59)	-0,11 (5,13)***	-0,001 (5,9)***	-0,01 (2,17)**
Financial Development	0,01 (1,1)	0,08 (2,41)**	0,001 (4,69)***	0,013 (1,76)*
Trade openness	0,002 (0,53)	0,047 (3,04)***	0,002 (2,77)***	0,002 (0,69)
FDI	-0,001 (0,88)	-0,085 (1,89)*	-0,001 (2,11)**	-0,004 (0,43)
observations	903	903	903	903
Number of countries	43	43	43	43
R ² Within	0,45	0,59	0,21	0,32

Source: Author. Figures in brackets correspond to the statistics of Student ***, ** and * indicate that variables are significant at 1%, 5% and 10% respectively

5. Conclusions and Economic policy recommendations

Ultimately, this paper examined the effect of natural resource endowments on the relationship between growth and income inequality. The SSA countries provided the framework for analysis. First, it was examined whether there is a non-linear relationship between growth and income inequality from a wide panel of SSA countries between 2000 and 2020. For this, we used non-parametric and semi-parametric models in panel data.

In a second step, to estimate the effects of natural resources on growth-income inequality. To this end, it focused on the methodological framework which is mainly based on econometric analyses relating to the panel data method. After the econometric tests, the results of the regression confirmed that the relationship is non-linear with a positive trend between growth and income inequality, changing convexity according to the level of growth and that the rents from non-renewable resources (oil, gas and other minerals) accentuate the negative effect of growth on income inequality while revenues from renewable resources (water and forests) have the effect of reducing inequalities.

Therefore, given the abundance of renewable and non-renewable natural resources in SSA, it is essential that governments encourage and support the exploitation and development of these sectors. This can be achieved through structural transformation of SSA economies and development of global value chains.

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The Impact of Company Size, Leverage, and Free Cash Flow on Earnings Management and Company Value in LQ45 Companies Listed on the Indonesia Stock Exchange in 2018- 2022

RB. Iwan Noor Suhasto¹, Shinta Noor Anggraeny², Dewi Kirowati³, Alif Fidyah Nur Khasanah⁴

^{1,2,3,4} Accounting Department, State Polytechnic of Madiun, Madiun, Indonesia

Correspondence: RB. Iwan Noor Suhasto, Accounting Department, State Polytechnic of Madiun, Madiun, Indonesia. E-mail: abubilly@pnm.ac.id

Abstract

The aim of this research is to examine the effects of firm size, leverage, and free cash flow on earnings management and firm value. The population for this study consists of all companies listed on the LQ45 index at the Indonesia Stock Exchange from 2018 to 2022. The sample was selected using purposive sampling, resulting in 22 companies. This study employs a quantitative approach, utilizing IBM SPSS 23 for data analysis, with hypothesis testing conducted through Structural Equation Modelling (SEM). The results indicate that the proportion of firm size has a negative and insignificant effect on earnings management and firm value. Conversely, leverage growth and free cash flow have a positive and significant impact on both earnings management and firm value.

Keywords: Firm Size, Leverage, Free Cash Flow, Earnings Management, Firm Value

1. Introduction

A higher company valuation will enhance investor confidence, not only in the current performance of the company but also in its future prospects. For companies that issue shares for public sale, the company's value can be observed in the stock price traded on the Stock Exchange. The higher the stock price, the greater the wealth of shareholders (Darmawan & Firdausy, 2021).

Earnings management involves the application of accounting principles that allow managers the flexibility to choose appropriate procedures when making assumptions and estimates regarding their business scope (Fadhilah & Kartika, 2022). Based on existing realities, nearly all users of financial statements tend to focus solely on information concerning the company's profits without considering how those profits are achieved. This can motivate company management to take certain actions that benefit themselves. This situation may occur when a company faces conditions where management fails to meet the established profit targets, leading management to exploit the flexibility provided by accounting standards to modify the reported earnings in financial statements. Management is motivated to demonstrate good performance in creating value or maximizing profits for the

company, thus tending to select and apply accounting methods that can produce more favourable profit information (Setiawati et al., 2019).

Next, we discuss free cash flow and leverage. Based on company size, larger firms tend to have greater sales, higher stability, and engage more stakeholders. This provides a stronger incentive for companies to engage in earnings management. Company size is measured using the Log of Natural Total Assets (Setiawati et al., 2019). The next factor influencing earnings management practices is leverage. This ratio is used by investors to assess a company's ability and risk. Excessive debt can threaten a company's sustainability, as it may lead the firm into a cycle of debt that is difficult to repay. Leverage is measured by the Debt to Asset Ratio (DAR) to evaluate the efficiency of debt usage in managing the company's assets. Another factor related to earnings management is free cash flow. Free cash flow is used to measure growth, financial performance, and the stability of a company. It provides investors with an insight into the number of dividends they can expect, as well as reflecting the company's ability to endure in the future (Natalia Wijaya & Hendriyeni, 2021).

Based on previous research journals, there are discrepancies in findings among different studies. This inconsistency in results motivates the researcher to conduct a study titled "The Influence of Company Size, Leverage, and Free Cash Flow on Earnings Management and Company Value in LQ45 Companies Listed on the Indonesia Stock Exchange from 2018 to 2022." This research aims to provide empirical evidence regarding the impact of company size, leverage, and free cash flow on the practices of earnings management and the value of LQ45 companies listed on the Indonesia Stock Exchange.

The hypotheses in this study are as follows:

- a) Earnings quality has an impact on earnings management.
- b) Leverage has an impact on earnings management.
- c) Free cash flow has an impact on earnings management.
- d) Earnings quality has an impact on firm value.
- e) Leverage has an impact on firm value.
- f) Free cash flow has an impact on firm value.

2. Method

This research employs a causal associative quantitative research method aimed at demonstrating the existence of an influence relationship between two or more variables. The population studied in this research consists of companies listed on the LQ45 index on the Indonesia Stock Exchange (IDX). The data utilized is secondary data obtained from annual financial statements over five consecutive years, specifically from 2018 to 2022, covering a total of 64 companies.

Samples in this study were selected using purposive sampling techniques, where samples were chosen based on specific considerations. After aligning with the sample selection criteria, there are 22 sample companies that became the subjects of this research, resulting in a total of 110 observations. The results of this selection are detailed in a table.

The data for this research was sourced from secondary data using a non-participant observational data collection method, meaning that the researcher did not directly engage in the operational activities of the companies. This method involved observing and recording the necessary data from LQ45 companies listed on the Indonesia Stock Exchange (IDX). The data obtained consists of the annual financial statements of LQ45 companies downloaded from the website www.idx.co.id.

Structural Equation Modeling (SEM) is a statistical method capable of exploring patterns of relationships between latent variables and their indicators, as well as between one latent variable and another, including measurement errors directly. With SEM, we can conduct analyses that directly involve several exogenous and endogenous variables. This study includes five latent variables tested using AMOS software. This test aims to provide answers regarding the hypotheses being tested, determining whether they are accepted or rejected (Pramudita et al., 2020).

3. Result

The criterion used in this hypothesis testing is to evaluate the significance value of the variables. If the significance value (sig) is less than 0.05, the hypothesis is accepted. Conversely, if the significance value is greater than 0.05, the hypothesis is rejected. The significance level used in this study is 5% (0.05), which means the margin of error in this research is 5%, or in other words, the confidence level is 95%. A total of six hypotheses are tested. The results of the data from these hypotheses will be presented in the table below.

Table 1: Test Result

Hypothesis	Path	Estimate	P	Result	R-Square
H ₁	Y1 ← X1	-0,287	0,169	Rejected	
H ₂	Y1 ← X2	0,000	0,577	Rejected	0,432
H ₃	Y1 ← X3	0,000	***	Accepted	
H ₄	Y2 ← X1	-1,164	0,186	Rejected	
H ₅	Y2 ← X2	0,004	0,016	Accepted	0,050
H ₆	Y2 ← X3	0,000	0,012	Accepted	

Based on the results of the hypothesis testing in the table above, it can be concluded that the impact of company size, leverage, and free cash flow collectively on earnings management shows an R-squared (R') value of 0.432. This indicates that the coefficient of determination is 43.2%. This figure signifies that the simultaneous influence of company size, leverage, and free cash flow on earnings management accounts for 43.2%, while the remaining 56.8% is influenced by other factors. According to the table above, the effect of company size, leverage, and free cash flow collectively on company value shows an R-squared (R') value of 0.050. This indicates that the coefficient of determination is 5.0%. This figure means that the simultaneous effect of company size, leverage, and free cash flow on company value is 0.50%, while the remaining 90.5% is affected by other factors. In addition to the collective (simultaneous) effects, individual impacts of each variable can also be summarized as follows:

1. The estimate value in H1 explains that the path coefficient for variable X1 (size of the company) in relation to variable Y1 (earnings management) is -0.287, which indicates a negative value, meaning that company size negatively affects earnings management. The P-Value for variable X1 (size of the company) in relation to variable Y1 (earnings management) is 0.169, which signifies a significance level greater than 0.05. Therefore, it can be concluded that variable X1 (size of the company) has a negative and insignificant effect on variable Y1 (earnings management).
2. The estimate value in H2 indicates that the path coefficient for variable X2 (leverage) in relation to variable Y1 (earnings management) is 0.000, which indicates a positive value, meaning that leverage positively affects earnings management. The P-Value for variable X2 (leverage) in relation to variable Y1 (earnings management) is 0.577, which also signifies a significance level greater than 0.05. Thus, it can be concluded that variable X2 (leverage) has a positive but insignificant effect on variable Y1 (earnings management).
3. The estimate value in H3 illustrates that the path coefficient for variable X3 (free cash flow) in relation to variable Y1 (earnings management) is 0.000, indicating a positive value, which means that free cash flow positively affects earnings management. The P-Value for variable X3 (free cash flow) in relation to variable Y1 (earnings management) is ***, indicating a significance level less than 0.05. Therefore, it can be concluded that variable X3 (free cash flow) has a positive and significant effect on variable Y1 (earnings management).
4. The estimated value in H5 indicates that the path coefficient of variable X2 (leverage) with respect to variable Y2 (firm value) is 0.004, which is positive. This suggests that leverage positively influences firm value. Furthermore, the P-Value for variable X2 (leverage) concerning variable Y2 (firm value) is 0.016, indicating a significance level below 0.05. Therefore, it can be concluded that variable X2 (leverage) has a positive and significant impact on variable Y2 (firm value).
5. The estimate value in H6 indicates that the path coefficient for variable X3 (free cash flow) in relation to variable Y2 (firm value) is 0.000, which is positive. This means that free cash flow has a positive influence on firm value. Additionally, the P-Value for variable X3 (free cash flow) concerning variable Y2 (firm value) is 0.012, indicating a significance level of less than 0.05. Therefore, it can be concluded that variable X3 (free cash flow) has a positive and significant effect on variable Y2 (firm value).

The output results from SEM AMOS showing both direct and indirect effects on each variable are presented in the following path diagram:

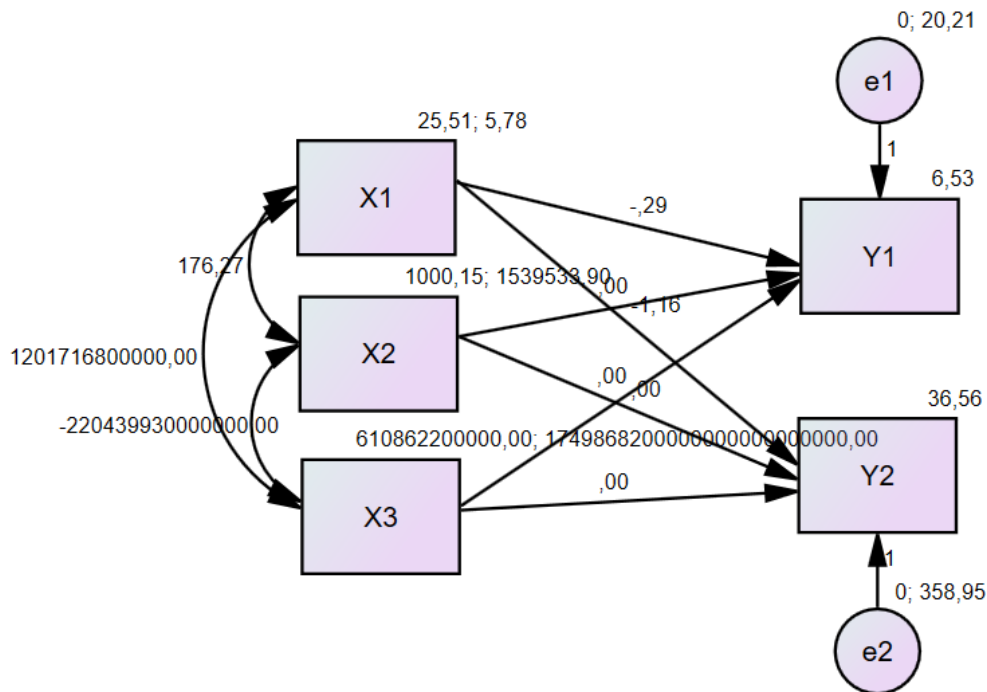


Figure 1: Structural Model

Figure 1 illustrates the proposed structural model for hypothesis testing. This model meets the established criteria. The results of the first path analysis indicate that firm size (X1) can directly affect earnings management (Y1), with a direct effect size of -0.29. The second path analysis shows that leverage (X2) can directly impact earnings management (Y1), with a direct effect size of -1.15. The third path analysis reveals that free cash flow (X3) can also directly influence earnings management (Y1), with a direct effect size of 0.00. The fourth path analysis indicates that firm size (X1) can directly affect company value (Y2), with a direct effect size of 0.00. The fifth path analysis suggests that leverage (X2) can directly impact company value (Y2), also with a direct effect size of 0.00. Finally, the sixth path analysis shows that free cash flow (X3) can directly influence company value (Y2), with a direct effect size of 0.00.

4. Discussion

The estimated value obtained for the firm size variable (X1) is -0.287 with a P-Value of 0.169. The P-Value analysis shows a significance level greater than 0.05. Therefore, there is a negative and insignificant effect of firm size on earnings management, leading to the rejection of H1. This result contradicts the grand theory proposed by Fadhillah & Kartika (2022), which states that according to agency theory, as firm size increases, the likelihood of earnings management decreases. However, this study finds that firm size has a positive influence on earnings management. The findings align with research conducted by Anindya & Afri Yuyetta (2020) and Fandriani & Tunjung (2019), indicating that firm size has a negative and insignificant effect on earnings management. This suggests that firm size does not necessarily reduce the likelihood of earnings management, as larger firms have more assets, and there are often many assets that are not managed effectively, leading to potential misstatements in the disclosure of total assets.

The estimated value of the leverage variable (X2) is 0.000 with a P-Value of 0.577. The P-Value analysis shows a significance level greater than 0.05. Therefore, there is a positive and insignificant effect of leverage on earnings management, resulting in the rejection of H2. This finding is consistent with the grand theory by Fadhillah & Kartika (2022), which states that according to agency theory, leverage does not influence earnings management.

This is also supported by research conducted by Anindya & Afri Yuyetta (2020) and Natalia Wijaya & Hendriyeni (2021). This can be attributed to the fact that firms do not require actions that support them in certain situations. Companies find themselves in a stable or secure condition, being able to service debts used to finance their assets. The research findings are not in line with those conducted by Sitanggang & Purba (2022) and Fandriani & Tunjung (2019), which indicate that leverage has a positive and significant effect on earnings management in a partial context.

The estimated value obtained for the variable of free cash flow (X3) is 0.000 with a P-Value smaller than 0.0001, thus it cannot be defined in the testing application. The analysis results show a P-Value of less than 0.05, indicating significance. Therefore, there is a positive and significant effect between free cash flow and earnings management, leading to the acceptance of H3. This result contradicts the grand theory proposed by Fadhilah & Kartika (2022), which states that according to agency theory, free cash flow positively influences earnings management, as managers are often compensated based on company performance, particularly profit. When free cash flow is abundant, managers have stronger incentives to engage in earnings management, meaning they may manipulate accounting numbers to make profits appear better than they truly are, aiming to increase bonuses, stock options, or their personal reputation. In contrast, the study found that free cash flow negatively impacts earnings management. This finding aligns with the research of Natalia Wijaya & Hendriyeni (2021) and Christabel & Bangun (2020), which suggests that managers are responsible for managing the company and tend to engage in earnings management to secure funding from shareholders. The higher the free cash flow value, or the cash not allocated for working capital, the less pressure managers feel to modify financial reports or engage in earnings management, as their performance already appears favourable in the eyes of shareholders while the company is in a healthy condition.

The estimated value produced for the company size variable (X1) is -1.164 with a P-Value of 0.186. The analysis shows that the P-Value is greater than 0.05, indicating non-significance. Therefore, there is a negative and insignificant effect of company size on company value, leading to the rejection of H4. This finding contradicts the grand theory proposed by Nurwanto (2022), which states that according to agency theory, company size has a positive and significant influence on company value, as larger companies can reduce conflicts of interest between owners and managers. Managers of larger firms tend to focus more on long-term company goals because they hold more shares or stock options. Additionally, larger companies usually have stronger internal control mechanisms to oversee managerial performance. However, the results of the tests obtained are contradictory. Despite the differing test outcomes and agency theory, the results align with research conducted by Khoeriyah (2020) and Kadim & Sunardi (2019), which suggests that company size does not negatively and significantly impact company value. This implies that possessing a large total asset does not necessarily guarantee investors will invest or manage the company with the goal of increasing its value. Investors are less concerned with the size of total assets and more inclined to evaluate aspects demonstrating a company's performance, which can be found in its financial statements, such as the company's reputation and dividend policy, before deciding to purchase shares in that company.

The estimated value obtained for the leverage variable (X2) is 0.004 with a P-Value of 0.016. The analysis results indicate that the P-Value is less than 0.05, demonstrating sufficient significance. Thus, there is a positive and significant effect of leverage on firm value, leading to the acceptance of H5. This finding aligns with the grand theory of Nurwanto (2022), which states that according to agency theory, leverage has a positive and significant effect on firm value, explaining that the higher the leverage ratio, the larger the capital structure financed by debt to support existing equity. The use of leverage allows companies to maximize their operations, consequently increasing their profit potential. This test result differs from the research of Kadim & Sunardi (2019) and Khoeriyah (2020), which argue that leverage has a negative and significant impact on firm value.

The estimated value generated for the free cash flow variable (X3) is 0.000 with a P-Value of 0.012. The analysis shows that the P-Value is less than 0.05, indicating significance. Therefore, there is a positive and significant effect of free cash flow on firm value, which means H6 is accepted. This result is consistent with the grand theory of Nurwanto (2022), which states that according to agency theory, free cash flow positively and significantly influences firm value, indicating that free cash flow can be used for discretionary activities such as acquisitions

and capital investments to support company growth. This test result contradicts the findings of Putri & Aris (2023), which state that free cash flow does not have a significant effect on firm value.

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Work-Life Balance, Job Satisfaction, and Employee Loyalty

Cieka Fitri Ramadhani Oliy¹, Henky Lisan Suwarno², Bram Hadianto³

^{1,2,3} Faculty of Law and Digital Business, Maranatha Christian University, Bandung, Indonesia

Correspondence: Cieka Fitri Ramadhani Oliy, Master of Management Department, Maranatha Christian University, Email: 2353004@bus.maranatha.edu

Abstract

This study explores two crucial effects that could potentially affect the understanding of organizational behavior. The first is the influence of work-life balance (WLB) on employee loyalty (EL). The second is the influence of job satisfaction on employee loyalty. The population and samples come from centennial employees between 17 and 29 years old in Jakarta, Bogor, Depok, Tangerang, and Bekasi. The snowball sampling is utilized to sample them. After surveying them by distributing the questionnaire from May 4 to 14, 2024, this study received 220 responses. Then, it utilizes a structural equation model based on covariance to examine the related effects statistically. The data processing result demonstrates two positive signs: WLB and JS positively affect EL. These findings have significant practical implications for organizations seeking to enhance employee loyalty through WLB and work satisfaction.

Keywords: Employee Loyalty, Gen-Z Employees, Job Satisfaction, Work-Life Balance

1. Introduction

Aside from structural capital, consisting of procedures and systems to make the firm perform, another resource is people (Gerhart & Feng, 2021). To effectively work, these people must be trained well to have sufficient knowledge, skill, and ability (Shubita, 2023). Z is among the generations significantly dominating the workforce as employees (Waworuntu et al., 2022). This generation was born between 1995 and 2010 (Mahapatra et al., 2022) with unique characteristics: independence, tolerance, creativity, self-confidence, and open-mindedness (Kuczerska & Smoląg, 2018). Besides, related people use technology, the internet, smartphones, and social media to communicate (Mahapatra et al., 2022).

Regrettably, Generation Z is characterized by job hopping, often quickly changing jobs by resigning (Nabahani & Riyanto, 2020). As a result, the company must bear the high intangible costs of employees, such as losing their expertise and knowledge (Steenackers & Guerry, 2016). In other words, their loyalty to work becomes an issue for the company (Darmawan et al., 2020). Furthermore, to overcome disloyalty, some studies argue that the company must apply work-life balance (WLB) (Al Kabir & Rahman, 2019; Bagis & Adawiyah, 2022; Gorospe et al., 2024; Rahmansyah et al., 2023; Walidah et al., 2024) and effort to create job satisfaction (Ateeq et al., 2023; Bagis & Adawiyah, 2022; Chen et al., 2022; Dhir et al., 2020; Farrukh et al., 2019; Phuong & Vinh, 2020).

Although two ways effectively solve the disloyalty of employees, some scholars declare that WLB cannot effectively handle this loyalty issue reflected by an insignificant relationship (Mea & Se, 2023; Reners et al., 2024;

Yudiani et al., 2023). Meanwhile, another scholar confirms that job satisfaction cannot overcome the same problem, reflected by the meaningless association between JS and EL (Thanos et al., 2015). Regarding these inconsistent facts, this study aims to reexamine and analyze the effect of work-life balance and job satisfaction on employee satisfaction by utilizing Gen-Z employees.

2. Literature Review and Hypothesis Development

2.1 *Employee Loyalty*

For a company, the loyalty of employees is considered one of the foremost factors for business growth and sustainability (Farrukh et al., 2019) and reflects their psychological condition describing the relationship with the company: they will trust in the firm, own a sense of belonging, and not leave the company (Dutta & Dhir, 2021). Employees with high loyalty tend to work optimally and proudly tell others about company achievements. Also, they pay attention to their development (Rahmansyah et al., 2023).

2.2 *Work-life Balance and Employee Loyalty*

Work-life balance (WLB) is a fulfilled equilibrium between personal responsibility and work role (Hasan et al., 2021) or between career aspiration and individual and family life (Blumberga & Berga, 2022). According to Qi et al. (2024), WLB consists of flexible work arrangements (FWA), time management (TM), and personal commitment support (PCS). FWA allows employees to control their timetables to meet their obligations and responsibilities. With TM, the company provides training and mentoring to employees for completing the job. Meanwhile, PCS is a company trying to provide parental leave to take care of children and childcare services and facilities during work. In their research, Al Kabir and Rahman (2019) and Bagis and Adawiyah (2022) prove that an upright work-life balance can increase employee loyalty to work. Similarly, Rahmansyah et al. (2023), Gorospe et al. (2024), and Walidah et al. (2024) affirm this tendency. Based on this explanation, the first hypothesis is formulated like this:

H₁: Work-life balance positively affects employee loyalty.

2.3 *Job Satisfaction and Employee Loyalty*

Job satisfaction reflects how contented the employees are with work (Aruldoss et al., 2022; Ateeq et al., 2023). This satisfaction will exist if the firms can fulfill what they hope. Hence, this satisfaction is a positive emotional reaction based on work experience (Phuong & Vinh, 2020). In their research, Sutanto and Perdana (2016) use satisfaction based on leader (SBL), compensation (SBC), and environment (SBE) to relate to loyalty. After testing respondents' perspectives, they affirm the positive impact of SBL, SBC, and SBE on employee loyalty. Besides, Farrukh et al. (2019), Dhir et al. (2020), and Phuong and Vinh (2020) demonstrate a positive relationship between job satisfaction and employee loyalty. Meanwhile, Bagis and Adawiyah (2022), Chen et al. (2022), Ateeq et al. (2023), and Mea and Se (2023) confirm the same evidence. According to this evidence, the second hypothesis is formulated like this:

H₂: Job satisfaction positively affects employee loyalty.

2.4 *Research Model*

Based on previous studies and the development of hypotheses, the research model in Figure 1 is as follows.

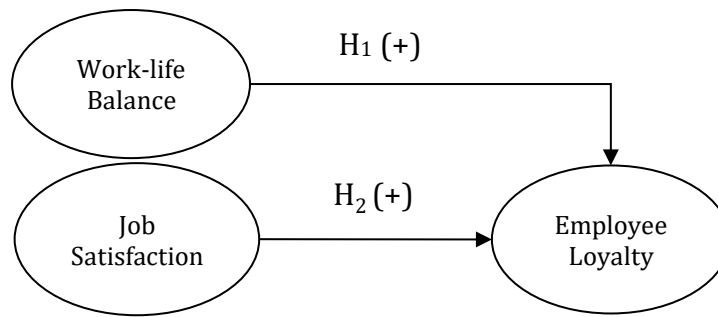


Figure 1: Research Model

Source: Hypothesis Development

3. Methods

Because of the hypothesis examination, this study adopted the quantitative approach, as Sugiyono (2022) explains. The data collection related to the primary is based on a survey. According to Sugiyono (2022), the survey involves the distribution of a questionnaire with Likert scales. By mentioning Joshi et al. (2015), this study uses the seven-point Likert scale because it gives the respondents various options to express their close views. One and seven are for totally disagree and agree on responses.

Besides, this study uses secondary data. According to Sugiyono (2022), these data come from a database provided by a third party. In this study context, the intended one is the manuscripts published in international and national journals. This study adapts three dimensions based on fifteen Hayman (2005) indicators to quantify work-life balance. It refers to Bledsoe and Brown (1977) and Dutta and Dhir (2021) to measure dimensions and their indicator related to job satisfaction and employee loyalty, respectively. All of their details are in Table 1.

Table 1: Variable Operationalization

Position	Variable	Dimension	Indicator	Source
Exogenous	Work-Life Balance	Work Interference with Personal Life (WIPL)	This work disturbs my personal life (WIPL1). This work makes my personal life problematic (WIPL2). This work neglects my personal needs (WIPL3). This work has become a priority in my personal life (WIPL4). This work makes me forget my life activity (WIPL5). I struggle to juggle work and non-work (WIPL6). I am unhappy with non-work activities (WIPL7).	Hayman (2005)
		Personal Life Interference with Work (PLIW)	My personal life reduces my energy to work (PLIW1). I am too exhausted in the workplace (PLIW2). My personal life disturbs my work (PLIW3). I cannot work well because of my personal life (PLIW4).	
		Work Personal Life Enhancement (WPLE)	My personal life creates energy for my job (WPLE1). My job gives me the energy to pursue personal activities (WPLE2). My personal life creates a better mood at work (WPLE3). My job has led me to a better mood (WPLE4).	

Table 1: Variable Operationalization

Position	Variable	Dimension	Indicator	Source
Endogenous	Job Satisfaction	Extrinsic satisfaction (ES)	I am satisfied with the following: a. The way my supervisors handle their subordinates (ES1). b. The competence of my supervisor to decide (ES2). c. The firm policy applied (ES3) d. The compensation for the job (ES4) e. The increasing position in the company (ES5). f. The tribute is given after I successfully perform the job (ES6).	Bledsoe and Brown (1977)
		Intrinsic satisfaction (IS)	I am satisfied because: a. I am always busy at work all times (IS1). b. I can work alone in the workplace (IS2). c. I can do diverse things from time to time (IS3). d. I can be someone in the society (IS4). e. I can work on something ethically (IS5). f. My job provides stability in life (IS6). g. I can do things for other people (IS7). h. I can tell people what to do (IS8). i. I can freely judge something in the workplace (IS9) j. I can do something based on my abilities (IS10) k. I can try to finish the job by utilizing my methods (IS11). l. I can accomplish my job (IS12).	
Endogenous	Employee Loyalty	Sense of Ownership (SO)	I always say positive things when getting the opportunity in front of the public (SO1). I always wait for another working day (SO2). I always promote my company brand (SO3). I suggest everyone use the service and buy goods from my company (SO4). I have a sense of belonging to this company (SO5). I receive numerous things from this company (SO6).	Dutta and Dhir (2021)
		Trust (TR)	My teammates will support me at the workplace (TR1). The management at my firm resolves employee complaints (TR2) I count on the words of co-workers (TR3). My subordinates can be trusted to finish their tasks (TR4).	
		Willingness to Stay (WTS)	If I have a choice, I will be with this company (WTS1). I will rarely look for a new job (WTS2). I often think about resigning (WTS3).	

Source: Compiled by author, 2024

Furthermore, this study utilizes snowball sampling by contacting the recognized employees. After that, they are asked to contact their colleague to participate in this survey, as Dorothy et al. (2021) executes. By utilizing this survey, which was conducted between May 4 and 14, 2024, this study can effectively obtain 220 Gen-Z employees around Jakarta, Bogor, Depok, Tangerang, and Bekasi. Hence, this study utilizes the structural equation model based on covariance, as Ghozali (2021) declares. Therefore, the validity, reliability, and goodness of fit model testing are essential before the hypotheses examination (Ghozali, 2017).

- This study uses confirmatory factor analysis to validate the responses. The responses to indicators and dimensions will exist if the loading factor and average variance extracted (AVE) exceed 0.5. For reliability testing, this study utilizes composite reliability (CR). Reliable answers to indicators and dimensions will happen if CR is above 0.7 (Hair Jr. et al., 2019).
- This study uses several measurements to detect goodness of fit, such as the Chi-square to the degree of freedom ratio (CMIN/DF), root mean square error of approximation (RMSEA), the parsimonious goodness of fit index (PGFI), normed fit index (PNFI), and comparative fit index (PCFI). The model fits with the data if CMIN/DF is less than three, RMSEA is lower than 0.08, and PGFI, PNFI, and PCFI are higher than 0.5 (Dash & Paul, 2021).
- Based on the model estimation result, this study utilizes t-statistical probability (1-tailed) of critical ratio to examine the proposed hypotheses. These hypotheses are acceptable if this probability is less than a 5% significance level (Hadianto et al., 2023).

4. Results

4.1 The Respondent Profiles

Following the survey of respondents, their profiles, including gender, age, domicile, marital status, work mode, employment status, and tenure, are detailed in Table 2. Out of total respondents, 59.5% are female and 40.5% are male. Mostly, they are between 20 and 24 years old (63.2%), have an undergraduate degree (80%), stay in Jakarta (46.4%), have single status (95%), onsite work mode (56.8%), permanent working status (41.8%), and tenure from one year to three years (47.3%) and below one year (45.9%).

Table 2: Respondent Features

Basic information	Description	Total	%
Gender	Male	89	40.5
	Female	131	59.5
Age	17 – 19	1	0.50
	20 – 24	139	63.2
	25 – 29	80	36.4
Educational level	Senior high school	24	10.9
	Vocational degree	13	5.9
	Undergraduate degree	176	80.0
	Graduate degree	7	3.2
Domicile	Jakarta	102	46.4
	Bogor	17	7.7
	Depok	54	24.5
	Tangerang	36	16.4
	Bekasi	11	5.0
Marital status	Single	209	95.0
	Married	11	5.0
Work mode	Onsite	125	56.8
	Hybrid	75	34.1
	Remote	20	9.1
Employment status	Permanent employee	92	41.8
	Contract employee	91	41.4
	Part-time	7	3.2
	Internship	19	8.6
	Volunteer	11	3.2

Table 2: Respondent Features

Basic information	Description	Total	%
Tenure	< 1 year	101	45.9
	1 – 3 years	104	47.3
	4 – 5 years	7	3.2
	6 – 10 years	8	3.6

Source: Processed data, 2024

4.2 The Instrumental Examination Results

By mentioning the first step of the confirmatory factor analysis, responses TR1, IS2, and IS5 were found to be inaccurate, as their loading factors fell below the threshold of 0.5: 0.354, 0.395, and 0.402, respectively. Upon excluding these indicators, this study reanalyzes the data and identifies IS1 as an invalid response, reflected by the LF under 0.5: 0.486. After vanishing it, the analysis is repeated. The results show that all remaining indicators are valid for the dimension of employee loyalty, shown by LF above 0.5 for SO1, SO2, SO3, SO4, SO5, and SO6: 0.663, 0.717, 0.685, 0.692, 0.826, and 0.724, supported by AVE beyond 0.5 for SO: 0.790; WTS1, WTS2, and WTS3: 0.521, 0.952, and 0.690, supported by AVE beyond 0.5 for WTS: 0.813; TR2, TR3, and TR4: 0.749, 0.737, and 0.794, supported by AVE beyond 0.5 for Trust: 0.812. In brief, LF for SO, WTS, and TR: 0.820, 0.902, and 0.637, respectively, all exceeding the 0.5 threshold. These values support the employee loyalty construct, which has an AVE of 0.837 (see Table 3).

For reliability examination results, reliable answers are available for SO, WTS, TR, and employee loyalty because the composite reliability exceeds 0.7: 0.863, 0.893, 0.912, and 0.919 (see Table 3).

Table 3: Validity and reliability test results for employee loyalty and job satisfaction

Dimension/ Construct	Position	Code	Loading factor	AVE	Composite Reliability
Sense of Ownership	Indicator	SO1	0.663	0.790	0.863
	Indicator	SO2	0.717		
	Indicator	SO3	0.685		
	Indicator	SO4	0.692		
	Indicator	SO5	0.826		
	Indicator	SO6	0.724		
Willingness to stay	Indicator	WTS1	0.521	0.813	0.893
	Indicator	WTS2	0.952		
	Indicator	WTS3	0.690		
Trust	Indicator	TR2	0.749	0.812	0.912
	Indicator	TR3	0.737		
	Indicator	TR4	0.794		
Employee Loyalty	Dimension	SO	0.820	0.837	0.919
	Dimension	WTS	0.902		
	Dimension	TR	0.637		
External Satisfaction	Indicator	ES1	0.837	0.804	0.944
	Indicator	ES2	0.731		
	Indicator	ES3	0.795		
	Indicator	ES4	0.723		
	Indicator	ES5	0.660		
	Indicator	ES6	0.702		
Internal Satisfaction	Indicator	IS3	0.638	0.795	0.958
	Indicator	IS4	0.666		
	Indicator	IS6	0.787		
	Indicator	IS7	0.687		
	Indicator	IS8	0.608		
	Indicator	IS9	0.751		
	Indicator	IS10	0.809		
	Indicator	IS11	0.823		
Indicator	IS12	0.742			

Table 3: Validity and reliability test results for employee loyalty and job satisfaction

Dimension/ Construct	Position	Code	Loading factor	AVE	Composite Reliability
Job	Dimension	ES	0.801	0.783	0.815
Satisfaction	Dimension	IS	0.582		

Source: Processed data, 2024

Similarly, valid responses exist for the indicators and their dimension of job satisfaction, reinforced by the LF above 0.5 for:

- ES1, ES2, ES3, ES4, ES5, and ES6: 0.837, 0.731, 0.795, 0.723, 0.660, and 0.702, supported by AVE exceeding 0.5 for External Satisfaction: 0.804 (see Table 3).
- IS3, IS4, IS6, IS7, IS8, IS9, IS10, IS11, and IS12, supported by AVE exceeding 0.5 for Internal Satisfaction: 0.795 (see Table 3).
- ES and IS as dimensions: 0.801 and 0.582, supported by AVE exceeding 0.5 for JS: 0.783 (see Table 3).

For reliability examination results, reliable answers are available for ES, IS, and job satisfaction because the composite reliability exceeds 0.7: 0.944, 0.958, and 0.815 (see Table 3).

The same situation occurs for work-life balance, where the result is in Table 4. In this table, all precise responses happen for indicators and dimensions of work-life balance, described by the LF above 0.5 for:

- WIPL1, WIPL2, WIPL3, WIPL4, WIPL5, WIPL6, and WIPL7: 0.786, 0.848, 0.821, 0.708, 0.709, 0.808, and 0.670, supported by AVE higher than 0.5 for WIPL: 0.817 (see Table 4).
- PLIW1, PLIW2, PLIW3, and PLIW4: 0.735, 0.758, 0.918, and 0.777, supported by AVE higher than 0.5 for PLIW: 0.839 (see Table 4).
- WPLE1, WPLE2, WPLE3, and WPLE4: 0.569, 0.753, 0.764, and 0.944, supported by AVE higher than 0.5 for WPLE, i.e., 0.824 (see Table 4).
- WIPL, PLIW, and WPLE: 0.781, 0.924, and 0.806, supported by AVE higher than 0.5 for work-life balance (WLB): 0.865 (see Table 4).

For reliability examination results, reliable answers are available for WIPL, PLIW, WPLE, and work-life balance (WLB) because the composite reliability exceeds 0.7: 0.957, 0.955, 0.929, and 0.940 (see Table 4).

Table 4: Validity and reliability test result for work-life balance

Code	Position	Loading factor			
		WIPL	PLIW	WPLE	WLB
WIPL1	Indicator	0.786			
WIPL2	Indicator	0.848			
WIPL3	Indicator	0.821			
WIPL4	Indicator	0.708			
WIPL5	Indicator	0.709			
WIPL6	Indicator	0.808			
WIPL7	Indicator	0.670			
PLIW1	Indicator		0.735		
PLIW2	Indicator		0.758		
PLIW3	Indicator		0.918		
PLIW4	Indicator		0.777		
WPLE1	Indicator			0.569	
WPLE2	Indicator			0.753	
WPLE3	Indicator			0.764	
WPLE4	Indicator			0.944	
WIPL	Dimension				0.781
PLIW	Dimension				0.924
WPLE	Dimension				0.806
Additional measurement					
AVE		0.817	0.839	0.824	0.865
Composite Reliability		0.957	0.955	0.929	0.940

Source: Processed data, 2024

4.3 The Goodness of Fit Examination Results

Table 5 presents the goodness of fit detection result based on five measures. Based on CMIN/DF, this value is 2.027, below three; therefore, the model fits with the data, reinforced by RMSEA below 0.08: 0.068, PGFI, PNFI, and PCFI exceeding 0.5: 0.674, 0.697, and 0.798.

Table 5: The Goodness of Fit Examination Results

Measurement	Value	Required point	Conclusion
CMIN/DF	2.027	Below three (Dash & Paul, 2021)	The model fits with the data
RMSEA	0.068	Below 0.08 (Dash & Paul, 2021)	
PGFI	0.674	Higher than 0.5 (Dash & Paul, 2021)	
PNFI	0.697	Higher than 0.5 (Dash & Paul, 2021)	
PCFI	0.798	Higher than 0.5 (Dash & Paul, 2021)	

Source: Processed data, 2024

4.4 The Model Estimation results

Table 6 depicts the estimated research model with the probability (1-tailed) of the critical ratio for testing the first and second hypotheses of 0.040 and ***. These values are significant at 5%; hence, the first and second hypotheses declaring a positive effect of WLB on JS on EL are acceptable, respectively.

Table 6: The Estimation Result of the Research Model: The Effect of Work-Life Balance and Job Satisfaction on Employee Loyalty

Hypothesis	Direction of hypothesis	Path Coefficient	Standard Error	Critical Ratio	Probability	
					(2-tailed)	(1-tailed)
One	WLB → EL	0.060	0.034	1.750	0.080	0.040
Two	JS → EL	0.512	0.089	5.737	***	***

Source: Processed data, 2024

5. Discussion

Based on the first hypothesis testing, this study exhibits a positive propensity of work-life balance toward employee loyalty. For Gen Z, a high WLB will create happiness without the workload because the related employees can flexibly manage their professional and personal duties well. In the end, they do not resign from work. Instead, they stand with their company (Waworuntu et al., 2022). Based on this propensity, this study supports Al Kabir and Rahman (2019), with 100 banking employees in Bangladesh, declaring that work-life balance positively affects employee loyalty. Equally, this study aligns with Bagis and Adawiyah (2022), using 135 employees from multiple construction firms in Indonesia; Rahmansyah et al. (2023), utilizing 55 coffee shop employees in Indonesia; Gorospe et al. (2024) with 150 employees in the business processing outsourcing industry in the Philippines; and Walidah et al. (2024), using 95 health center workers in Indonesia.

Based on the second hypothesis testing, this study declares a positive tendency of job satisfaction toward employee loyalty. According to Basem et al. (2022), keeping employees satisfied is essential to making them loyal. High-satisfaction employees usually feel recognized as firmly committed to the company and do not seek opportunities elsewhere. Based on this propensity, this study confirms Farrukh et al. (2019), utilizing 384 hotel employees from Saudi Arabia, exhibiting that job satisfaction affects employee loyalty positively. Similarly, this study affirms Dhir et al. (2020), utilizing 220 employees from India; Phuong and Vinh (2020), using 315 lodging employees in Vietnam; Bagis and Adawiyah (2022), utilizing 135 workers in construction firms in Indonesia; and Chen et al. (2022), utilizing 478 Chinese miners. Finally, this positive sign affirms Ateeq et al. (2023), studying 102 employees in a telecommunication company in Bahrain, and Mea and Se (2023), investigating 93 female lecturers in Indonesia.

Based on these proofs, this study suggests that the company optimizes working programs for Gen-Z employees, such as employee-of-the-month selection and attractive career development through online workshops, training, and mentoring, that are suitable for their features of respecting the chance to learn. Associated with WLB, the organization should apply flexible work hours, work from home, and annual leave with a structured approach, including assessing their effectiveness. Indeed, the company is expected to communicate its aspects to employees in advance.

6. Conclusion

This study examines two determinants of Gen-Z employee loyalty, i.e., work-life balance and job satisfaction. The employees intended are from Jakarta, Bogor, Depok, Tangerang, and Bekasi. After testing their response using a structural equation model based on covariance, this study demonstrates a positive effect of work-life balance and job satisfaction on employee loyalty. The limitation of this study lies in the several areas where Gen-Z employees exist and the total determinants of their loyalty. Related to the first one, the subsequent scholars should add the areas in Java, such as Bandung, Semarang, Surabaya, and Yogyakarta, so that more samples can be collected and utilized. Associated with the second one, they should explore the industry where the Gen-Z work and their salary and add them as control variables to describe how Gen-Z reacts to economic factors related to their loyalty.

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Exploring the Relationship Between Energy Consumption and GDP: Evidence from Bangladesh

Md Atiqul Islam¹, Md. Al Zabir Hassan Mithen²

¹ Professor, Department of Economics, University of Rajshahi, Rajshahi-6205, Bangladesh

² Graduate Student, Department of Economics, University of Rajshahi, Rajshahi-6205, Bangladesh

Correspondence: Md Atiqul Islam, Professor, Department of Economics, University of Rajshahi, Rajshahi-6205, Bangladesh. Tel: +88001717138289. E-mail: atiqru@ru.ac.bd

Abstract

This research examines the causal relationship between per capita gross domestic product (PCGDP) and per capita energy consumption (PCEC) in Bangladesh over the period of 1971 to 2023. The ARDL bound testing approach indicates a statistically significant positive relationship between PCGDP and PCEC. The results also reveal that there is a one directional linkage running through PCEC to PCGDP. This indicates that an increase in energy consumption has a direct impact on GDP growth. This suggests that rather than energy conservation, priority to generate energy generation as a means of achieving higher GDP is needed for Bangladesh.

Keywords: Economic Growth, Energy Consumption, Autoregressive Distributive Lag Model, Bangladesh

1. Introduction

Energy consumption is a significant indicator of a country's level of development (Gozgor et al., 2018). It is also considered as one of the vital production factors for an economy. However, research on the topic of causal relation between energy consumption and income is enormous in the literature. Empirical studies vary on the basis of methodology, time periods considered, country or countries of study to considered and uses of proxy variables for energy consumption and income. Moreover, the results vary on the direction of causality and the long-term versus short-term impact. Depending upon the causal relationship of this, policy implications would be different for a country.

Bangladesh, a developing country is experiencing a growth in energy consumption as well as demand because of structural changes in the economy, population growth, urbanization, and industrialization (Debnath et al., 2015). For the future development of energy policy, the causal relation between energy consumption and GDP is required. This study attempts to examine this causal relationship. Our study raises some important questions: does long-term equilibrium relation exist between energy consumption and GDP in Bangladesh? How do they influence each other in the short-term? Answers to these questions are necessary to define and implement the appropriate energy development policies in Bangladesh.

The remainder of this paper is organized as follows: Section 2 provides a literature review. A detail description of the data and methodology of the study is presented in Section 3. Section 4 describes the findings of the study. The next section is a discussion related to the findings to provide the policy implications of the empirical results. Final section 6 gives conclusions for this study.

2. Review of the Literature

The causal relation between energy consumption and income is traced back to Kraft and Kraft (1978) in the literature. In their pioneering study for the United States, they utilized the technique of Sims (1972) and used annual data for the period of 1947-1974. This research found a unidirectional causality running from income to energy consumption. These findings implied that energy conservation policies may be initiated without deteriorating economic side effects. However, later on, Akarca and long (1980) pointed out that Kraft and Kraft's study suffers from temporal sample instability. Since then, a plethora of studies have dealt with the causal relationship between energy consumption and income in the literature of energy economics using different methodologies, different countries, different time periods, and different proxy variables for energy consumption and income. Menegaki (2014) provided a good review. However, for the simplicity of our analysis, we discussed further considering three issues, studies considering group of countries, studies on only one countries and studies related to Bangladesh. Some of this literature is highlighted here below in three different sub-groups.

2.1 Studies on Group of Countries

This group of studies tried to examine the relationship between energy consumption and income considering a group of countries. For example:

Soytas and Sari (2003) examined the causal relation between GDP and energy consumption considering the top 10 emerging markets and G-7 countries. Using cointegration and vector error correction techniques this study uses annual energy consumption and GDP per capita for the analysis. It is found that bi-directional causality exists in Argentina. For Italy and Korea, causality runs from GDP to energy consumption. On the contrary, causality runs from energy consumption to GDP in Turkey, France and Germany and Japan. Therefore, this study argued that energy consumption may harm economic growth for the last four countries where causality runs from energy consumption to GDP.

Lee (2005) investigated the co-movement and causal relationship between energy consumption and GDP in 18 developing countries. Using data for the period 1975 to 2001 this study employed heterogeneous panel cointegration and panel-based error correction models. The empirical results showed that long-run and short-run causalities run from energy consumption to GDP, but not vice versa.

By examining 22 developed and 18 developing countries, Lee and Chang (2007) found that bidirectional causality between these two variables in developing countries, but a unidirectional causality from GDP to energy consumption in developing countries. For their analysis they applied a new panel data stationarity testing procedure with panel VARs that employ the GMM techniques and used per capita energy consumption and per capita real GDP as concerned variables.

Narayan and Popp (2012) examined whether there is long-run relationship between energy consumption and real GDP for 93 countries. Using panel cointegration and panel long-run Granger causality model they found a mixed results on the impact of energy consumption on real GDP. In most countries energy does not have a long-run Granger causal effect on real GDP. However, where this relationship exists, the energy consumption has a negative impact on real GDP. The overall conclusion drawn from the panel level analysis of this study is that some countries will benefit from energy conservation policies and others will not.

Caraiani, Lungu and Dascalu (2015) investigated the causality between per capita energy consumption and economic growth of five emerging European economies (Bulgaria, Hungary, Poland, Romania and Turkey)

considering data from 1980 to 2013. The causality analysis based on Engle and Granger model indicates that there is no possible impact of energy consumption on economic growth.

Al-mulali and Mohammad (2015) tested the causality between GDP by sector (agriculture, manufacturing, industrial and service sector) and energy consumption by type (oil, gas, coal and electricity) in 16 emerging countries considering panel model using data for the period of 1980-2010. The results of this study revealed that both bidirectional and unidirectional causality exist among different sectoral growth and different energy consumption. However, the major conclusion of this study is that countries should increase their renewable energy consumption to achieve their GDP growth.

2.2 Studies on Individual Country

Another group of studies tries to unfold the linkage between energy consumption and GDP for individual country. Some of them are as follows:

Lise and Montfort (2007) examined the causality between energy consumption and GDP for Turkey considering annual data over the period 1970-2003 using cointegration analysis. It is found that energy consumption and GDP are co-integrated and there is a unidirectional causality running from GDP to energy consumption. This research also tries to see the existence of energy Kuznets curve (EKC) for Turkey and finds the rejection of EKC hypothesis for Turkey.

Belloumi (2009) tested the causal relationship between per capita energy consumption (PCEC) and per capita GDP (PCGDP) for Tunisia during the 1971-2014 period using Granger causality and vector error correction model. The results indicated that the PCGDP and PCEC are related by one cointegrating vector. It is also found that long-run bi-directional causality runs between the two variables but short-run unidirectional causality runs from PCEC to PCGDP. The source of causation in the long-run was found to be the error-correction terms in both directions.

The study by Borozan (2013) used VAR and Granger causality tests covering the period between 1992 and 2010 in Croatia. They reported that the variables are not co-integrated. However, it was found that there was a unidirectional causality running from energy consumption to GDP. Furthermore, the impulse response function and variance decomposition analysis indicated that energy consumption was an important component determining economic growth in Croatia.

Mahalingam and Orman (2018) applied panel cointegration and panel causality test to examine the causal relationship between state energy consumption and state GDP for US economy for the period of 1978 to 2014. Their empirical estimates indicated a significant regional difference for two regions, the Rocky Mountain region and the Southwest region. Energy consumption Granger causes state GDP in the Rocky mountain region. Whereas, it was opposite in the Southwest region where GDP Granger caused energy consumption. Therefore, they suggested having a flexible federal energy policy to be most beneficial to the different regions of US.

2.3 Studies on Bangladesh

Two dimensions of studies found in the literature related to our topic on Bangladesh. First group of literature is found where relationship between GDP and energy consumption was examined. Considering data from 1980 to 2014, Amin and Alam (2018) found that there was a unidirectional causality from GDP to energy consumption. Similar findings were also found by Roy (2022) where they employed data from 1976 to 2014 considering per capita GDP to per capita energy consumption. On the contrary, considering data from 1981 to 2017, Sarker et al. (2019) found a bidirectional relationship. Even Islam and Ali (2011) did not find any direct relation between energy consumption and GDP growth. All of these studies used Johansen co-integration and Granger causality test for their analysis. However, using autoregressive distributive Lag (ARDL) bounds testing approach, Uddin et al. (2011) found a unidirectional causality running from energy consumption to GDP on 1971-2007 data.

The second group of literature is there where instead of energy consumption they used electricity consumption in their analysis and explored the relationship between energy consumption and GDP. Hossain and Hasan (2018) and Masuduzzaman (2012) found a unidirectional relation running from electricity consumption to GDP. On the contrary, Mozumder and Marathe (2007) found the same unidirectional causality but causality running from opposite directions, per capita GDP to per capita energy consumption. In addition, Ahmad and Islam (2011) found a bidirectional causality. Although these studies used cointegration and granger causality tests, they used different time span of data set.

Overall, from the above discussion on the literature, we have an apparently conflicting statistical findings on the relationship between energy consumption and GDP. Major reasons for these conflicting results seem to lie in methodological differences, time span of data used, and variables used as proxies for the interested variables. However, a country-specific causality study between energy consumption and economic growth can provide insight for designing future energy policies for that country. Moreover, it is also important to reach an unambiguous result for policy implementation.

3. Data and Methodology

3.1 Methodology

In order to determine the relationship and direction of causality between per capita energy (PCE) and per capita GDP (PCGDP) in Bangladesh, this research employs two stages. In stage one, the stationarity of the variables using the conventional Augmented Dickey Fuller (ADF) test and the Phillip-Peron (PP) test. The lag lengths are chosen using Akaike's information criterion. Stage two refers to testing the cointegration between variables. Based on the order of the time series we can use different techniques for testing the relationship between variables. Based on the existence of cointegration, the determination of the relationship is done either using Johansen cointegration or unrestricted VAR or ARDL cointegration technique (Nkoro and Uko, 2016). In this research we used ARDL bound testing approach for determining the relationship between PCEC and PCGDP.

3.2 Data

Empirical study here uses time series data of per capita GDP (PCGDP) and per capita energy consumption (PCEC) for the period of 1971-2023 in Bangladesh. PCGDP data are obtained from the data bank produced by the World Bank (World Bank, no date). Data on PCEC are obtained from processed data produced by Our World in Data (Our World in Data, no date). Per capita energy consumption is expressed in terms of kilowatt-hours and per capita GDP is expressed in constant 2015 US\$. The historical trends of PCGDP and PCEC for Bangladesh are depicted in Figure 1.

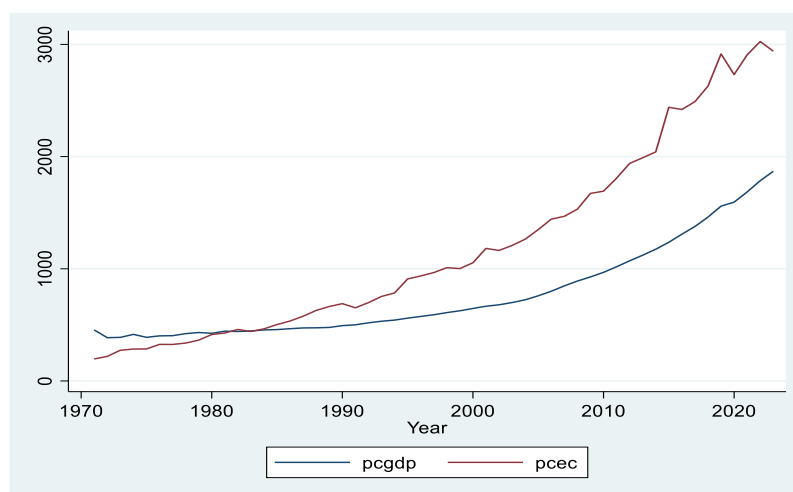


Figure 1: Per capita energy consumption and per capita GDP of Bangladesh

Source: Authors' construction using variable of interest

3.3 Descriptive statistics

Table 1 provides an insight into descriptive statistics of the variables used for this analysis. The correlation matrix indicates a significant positive relationship between the variables. The coefficient of correlation is equal to 0.98. Moreover, Figure 1 indicates that both variables exhibit an increasing trend in the period considered. All these suggest the possible existence of a strong link between them. However, before going into unveil the relationship and causality between them, a test for a unit root should be conducted.

Table 1: Summary statistics for both series

Variables	Description	Mean	S.D.	Min.	Max.
PCGDP	Per capita GDP (in constant 2015 US\$)	767.24	414.53	385.84	1869.16
PCEC	Per capita energy consumption (in kilowatt-hours equivalent)	1196.72	855.35	196.08	3025.79
Correlation	Pearson correlation coefficient		0.98***		
Observations			53		

Note: *** indicates the 1% level of significance

3.4 Unit Root

The results of ADF and PP unit root tests are summarized in Table 2. The results indicate that all variables are non-stationary in level. By taking first-difference of the variables, PP test indicates that the null hypothesis of a non-stationary process is rejected at the 5% significance level. That means that according to PP unit root test, the variables are I(1). However, ADF test does not indicate the so. Moreover, in the second difference of the variables, both test result indicates that for both the variables the null hypothesis of a non-stationary process is rejected at the 5% significance level. This indicates that the PCGDP and PCEC variables of Bangladesh are individually I(2).

Table 2: Unit root test

Variables	ADF			PP		
	Constant	Constant and Trend	Decision	Constant	Constant and Trend	Decision
<i>pcgdp</i>	3.539 (4)	3.533 (4)	UR	3.683 (4)	2.236 (4)	UR
<i>pcec</i>	2.91 (3)	-0.32 (3)	UR	1.41 (3)	-1.47 (3)	UR
Δ pcgdp	1.126 (3)	-0.932 (3)	UR	-13.87** (3)	-54.67*** (3)	S
Δ pcec	-1.86 (4)	-2.54 (4)	UR	-74.56*** (4)	-66.73*** (4)	S
2Δ pcgdp	-3.498*** (4)	-4.225*** (4)	S	-56.83*** (4)	-56.45*** (4)	S
2Δ pcec	-4.09*** (3)	-4.09***	S	-66.73*** (3)	-65.71*** (3)	S

Note: *, **, and *** indicate 10%, 5% and 1% levels of significance respectively; Lag order is shown in parentheses; This optimum lag length found here is shown in the parentheses; UR and S represent unit root and stationary respectively.

There are several cointegration techniques are available to us to reveal the long run relationships among time series variables, like Johansen cointegration and unrestricted VAR. However, all of these techniques required that all series have same ordered integrations as well as should not be more than I(1). In this respect, another approach developed by Pesaran et al. (2001), namely autoregressive-distributed lag (ARDL) also known as the bounds test which withdraws these restrictions. Because of this convenience, ARDL method has been used in many studies and in our study here we also used this technique to obtain the long-run relationship among the series.

3.4 Model Specification

The model that relates GDP and energy consumption is:

$$PCGDP = f(PCEC) \quad (1)$$

where PCGDP is the per capita gross domestic product and PCEC is the per capita energy consumption.

Equation (1) can be written as an ARDL formula as the model in equation (2) as follows:

$$\Delta pcgdp_t = \alpha + \sum_{i=1}^k \beta_{1i} \Delta pcgdp_{t-i} + \sum_{i=1}^k \beta_{2i} \Delta pcec_{t-i} + \beta_3 pcgdp_{t-1} + \beta_4 pcec_{t-1} + u_t \quad (2)$$

Where α is the drift component and u_t is white noise. The terms with summation signs represent the error correction dynamics, while the terms without summation represent to the long-run relationship. Long run relationship among these variables is examined by bound test.

According to the test, null hypothesis in the equation is $H_0: \beta_3 = \beta_4 = 0$. This indicates the existence of no cointegration. The alternative hypothesis is $H_1: \beta_3 \neq \beta_4 \neq 0$. According to Pesaran et al. (2001), if the calculated F statistic is higher than the upper bound critical value $I(1)$ for the number of explanatory variables (k), null hypothesis will be rejected. If the F statistic is lower than the lower bound critical value $I(0)$, null hypothesis cannot be rejected. The F statistic being between $I(0)$ and $I(1)$ puts for then indecision about cointegration. The optimal lag value k in equation (2) is chosen by the model selection criteria such as AIC and BIC. If there is cointegration then in the next step of ARDL process holds the long-run ARDL equation as follows:

$$pcgdp_t = \beta_0 + \sum_{i=1}^p \beta_{1i} pcgdp_{t-i} + \sum_{i=0}^q \beta_{2i} pcec_{t-i} + e_t \quad (3)$$

The selection of lag values of p and q in equation (3) is done using AIC and adjusted R-squared value. The best estimates model is the model with minimum AIC or maximum R-squared value. Finally, short-run estimation of ARDL also known as error-correction model is also known as error correction model is estimated in the equation below

$$pcgdp_t = \delta_0 + \sum_{i=0}^p \delta_{1i} pcgdp_{t-i} + \sum_{i=0}^q \beta_{2i} pcec_{t-i} + \lambda ECM_{t-1} + e_t \quad (4)$$

The coefficient of the error-correction term (ECM_{t-1}) λ in Eq. (4) is the speed of adjustment parameter which shows how quickly the series attains a long-run equilibrium. Based on the model we decide the relationship and the direction of causality between the variables here.

However, we discussed above only for the situation where PCGDP is considered a dependent variable. The same procedure will be followed for PCEC variable taking it into the dependent variable.

4. Empirical Findings

The ARDL Bounds testing approach was employed here to determine the presence of cointegration among the variables.

Before performing the cointegration test, it is necessary to determine the optimal lag length and then formulate the optimal model for the deterministic components in the system. Table 3 shows the results of the different lag order selection criteria. Most of the criteria suggested that for PCGDP and PCEC the optimal lag length order is 4 and 3 respectively. Therefore taking the maximum value, the maximum lag length was selected for equation (2) to be $k = 4$.

Table 3: Lag Order Selection Criteria

Lag	Endogenous variable					
	PCGDP			PCEC		
	AIC	HQIC	SBIC	AIC	HQIC	SBIC
0	14.92	14.94	14.96	16.33	16.34	16.37
1	7.75	7.78	7.82	11.73	11.76	11.81
2	7.69	7.73	7.81*	11.61	11.65	11.73
3	7.71	7.77	7.87	11.48*	11.54*	11.64*
4	7.63*	7.71*	7.83	11.52	11.59	11.71

Note: * indicating lag order selected by specific criteria. AIC= Akaike information criterion, SBIC= Schwarz's Bayesian information criterion, HQIC= Hannan-Quinn information criterion. Exogenous variable: C. Sample: 1971 to 2023.

Then from the model, optimum lag is obtained relying on the minimizing the Akaike Information Criterion (AIC) when the lag value k was equal to 4. According to AIC criterion the best model like equation (2) for PCGDP is

ARDL (2, 1) model which means $p = 2$ and $q = 1$. Similarly, model for PCEC is ARDL (3, 1). The results are presented in Table 4 for both the equations. The non-significant estimated F -statistics for PCEC cannot reject the null hypothesis of no cointegration and suggested no integration in PCEC model. On the contrary, for model PCGDP estimated a significant F -statistics suggested a cointegration in PCGDP equation over the period of 1971-2023 in Bangladesh. In this model, diagnostic tests like Lagrange multiplier test for serial correlation, Ramsey's RESET test for functional form results shown well.

Table 4: ARDL cointegration analysis

Model for	F-statistics	Critical Values Lower-Upper	Diagnostic test			Cointegration
			No Serial Correlation (Breush-Godfrey LM test)	Het. (White test)	Ramsey RESET test	
PCGDP	39.475***	4.124 – 8.463	4.794* (0.0286)	32.77 (0.0031)	3.54* (0.0224)	Yes
PCEC	2.377	4.109 – 8.501	0.284 (0.5944)	17.63 (0.6119)	5.54 (0.0028)	No

Note: *** and * indicate significant at 1% and 5% levels respectively. Het. indicates Heteroscedasticity. Diagnostic test results for no serial correlation and Heteroscedasticity are based on chi-square statistic and Ramsey RESET test of omitted variable test is based on F -statistics. Figures in the parenthesis represent probability values.

Table 5 provides the estimated results of the ARDL model that found the existence of cointegration. The long-run estimated results are shown here. It indicates that per capita GDP is determined by its lagged values, per capita energy consumption and its lagged values. Relating to our interest we can say that per capita energy consumption is a determinant of per capita GDP. In other words, per capita energy consumption Granger causes per capita GDP.

Table 5: ARDL (2, 1) Model Results

Dependent variable: PCGDP	Coefficient	St. error	T-ratio	Prob.
$PCGDP_{t-1}$	0.917***	0.1047	8.76	0.000
$PCGDP_{t-2}$	0.124	0.1026	1.22	0.230
$PCEC_t$	0.069***	0.0176	3094	0.000
$PCEC_{t-1}$	-0.055**	0.0217	-2.53	0.015
Intercept	-20.455***	5.5687	-3.67	0.001
$R^2 = 0.99, F(4, 46) = 21565.68 (Prob = 0.0000)$				

Note: ** and *** indicate significance at 5% and 1% levels respectively.

The short-run estimated results are shown in Table 6. The coefficient of the error correction term is positive as well as insignificant. That means when per capita GDP is far away from their equilibrium level, it cannot adjust. It means that the process here not converging. However, as our interest is in PCEC, it is shown as significant here. Now to add little bit more, a simple OLS estimate of a model from equation (1) is also done here.

Table 6: Short-run Estimation

Dependent variable: $\Delta PCGDP$	Coefficient	St. error	T-ratio	Prob.
$\Delta PCGDP_{t-1}$	-0.1249	0.1026	-1.22	0.230
$\Delta PCEC_t$	0.0551**	0.0217	2.53	0.015
Constant	-20.455*	5.5687	-3.67	0.001
ECM_{t-1}	0.0425	0.0240	1.77	0.083
$R^2 = 0.88$				

Note: ** and *** indicate significant at 5% and 1% level respectively.

The OLS estimates are shown in Table 7. As we found that our variables are $I(2)$, therefore to avoid the spurious regression we use the variables after making it stationary. The results here also indicate that the per capita energy consumption is a significant determinant of the per capita GDP.

Table 7: OLS Estimation Results

Dependent variable: <i>PCGDP</i>	Coefficient	St. error	T-ratio	Prob.
<i>PCEC</i>	0.071***	0.0198	3.58	0.001
<i>Constant</i>	3.148	2.5601	1.23	0.225
$R^2 = 0.20, Adj R^2 = 19, F(1, 49) = 12.80 (Prob = 0.0008)$				

Note: *** indicates significant at 1% level.

5. Discussion

Overall, from the above findings we may concluded that there is evidence of a unidirectional causal linkage that runs from per capita energy consumption to per capita GDP. Similar unidirectional causality running from energy consumption to GDP was found by Borozan (2013) in the case Croatia. In the case of Bangladesh, our result supports findings of the study done by Uddin et al. (2011). From this causality patterns, we may advocate the argument that more energy consumption refers to more value addition and consequently increase GDP of Bangladesh.

These findings again confirm the narrative that energy is an important factor in production. Therefore, energy is an important component determining economic growth for Bangladesh. Therefore, as policy perspective for the economic prosperity of the country, energy prices, availability of energy, technological progress need to considered seriously. Energy consumption is affected by all of these variables and it is possible to affect the economic growth of the country by their changes. However, for more useful policy suggestions, future research can be done analyzing disaggregated total energy consumption for coal, liquid fuel, natural gas, hydropower and electricity.

The findings again imply that because of energy-dependent economy, at first glance, a conservation policy may have an adverse effect on economic growth in Bangladesh. Consequently, it leads to a decrease in income and an increase in unemployment. Therefore, Bangladesh needs to formulate an efficient and effective energy policy that may also facilitate substitutions among sources towards cleaner and renewable energy forms of higher quantity. Moreover, no matter what kind of relationship exists between GDP and energy consumption, economic growth may be stimulated by improving efficiency in production and avoiding wasteful uses that may lead to increase in productivity of energy consumption which in turn may stimulate economic growth. Thus, energy conservation policies would not necessarily hinder economic growth in Bangladesh. We just need to formulate and implement energy policy judiciously.

6. Conclusion

Energy sector is very important for an economy. Scarce domestic resources and an unstable world energy market concern knowledge demanding for Bangladesh energy relation with GDP. Moreover, energy sources and policy are important issues for this.

This study investigated the relationship between per capita energy consumption (PCEC) and per capita GDP (PCGDP) in Bangladesh, focusing on the period from 1971 to 2023. To better understand the potential causal relationship between these two variables, the study employed relevant econometric techniques, the ARDL bound testing approach. The analysis indicates a statistically significant positive long-run relationship between PCGDP and PCEC. Moreover, the findings indicate a unidirectional causal relationship running from PCEC to PCGDP. The relationship indicating that per capita energy consumption has a significant impact on per capita GDP. In other words, per capita energy consumption is found to predict per capita GDP.

The study highlights the necessity of sufficient amount of energy production to ensure sustainable economic growth in Bangladesh. This suggests that the government ought to prioritize energy generation as a means of achieving greater per capita GDP in Bangladesh. The challenges for energy policy maker are to secure enough energy, maintain prices of energy, production and consumption of energy efficiency, and create new energy

sources. It could also be suggested that Bangladesh should explore energy generation from renewable resources, such as solar, hydroelectric, and wind energy.

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The Influence of Compensation and Transformational Leadership on Employee Performance Mediated by Work Motivation in Employees of PT PLN (Persero) West Java Distribution Main Unit

Fachrijal¹, Farah Wasaraka², Andreas W. Gunawan³

^{1,2,3} Doctoral Program in Economics, Trisakti University, Jakarta, Indonesia

Correspondence: Fachrijal, Doctoral Program in Economics, Trisakti University, Jakarta, Indonesia.
E-mail: fakhrijal082@gmail.com

Abstract

This research is motivated by the low performance of employees at PT. PLN (Persero) West Java Distribution Main Unit which has an impact on the company's overall performance. The purpose of this study is to determine how much influence compensation and transformational leadership have on employee performance mediated by work motivation. The population in this study were employees working at PT. PLN (Persero) West Java Distribution Main Unit totaling 172 people and with a sample size of 120 respondents. The sampling technique used in this study was probability sampling with a simple random sampling type. This study uses a quantitative approach that aims to test hypotheses with statistical methods as a way to process and analyze data. When viewed from its type, this research is included in associative research. Data processing and analysis used in this study were in the form of path analysis whose calculations were assisted by the SPSS program. The results of the study showed that compensation, transformational leadership, and work motivation partially had a positive and significant effect on employee performance. It is known that Compensation and Transformational Leadership together have a positive and significant effect on Work Motivation. Compensation, Transformational Leadership, and Work Motivation together have a positive and significant effect on Employee Performance. Meanwhile, it is also shown that work motivation can mediate the effect of compensation or transformational leadership on employee performance.

Keywords: Compensation, Transformational Leadership, Employee Performance, Work Motivation

1. Introduction

PT. PLN (Persero) West Java Distribution Main Unit is one of the business units of PT. PLN (Persero) which is responsible for distributing electricity needs throughout the West Java Province, as well as overseeing the performance of UPL (Customer Service Unit) which acts as the spearhead of electricity distribution in every region of West Java. In carrying out its operational activities, this company has 172 employees divided into 10 fields, including: Distribution Field, General Affairs Field, Finance Field, Trade & PP Field, Planning Field, Human Resources Field, K3L Control Bureau, Procurement Planning Bureau, GM & Functional Experts.

For this company, the existence of employees who are able to show their best work results while working has a very important role in efforts to achieve the goals that have been set. This is due to the duties and responsibilities of employees which are determining factors in the success of an organization or company in carrying out its operational activities every day. Even so, not always every employee who works is able to show their best work results which have an impact on improving the company's overall performance. In fact, in order to achieve the goals that have been set, and maintain the sustainability of the business run by the company, the company needs employees who are able to work optimally in order to achieve these goals. The following is a table explaining the performance achievements of PT. PLN (Persero) West Java Distribution Main Unit during the 2019-2022 Period:

Table 1: Performance Achievement of PT. PLN (Persero) West Java Distribution Main Unit 2019-2022

No.	Year	Power Connected (MVA)		
		Target	Realization	Percentage
1.	2019	112.458	111.415	99,07%
2.	2020	122.458	122.018	99,64%
3.	2021	131.458	130.281	99,10%
4.	2022	139.474	138.077	99,00%
Total		505.848	501.791	396,81%
No.	Year	Installed Capacity (MV)		
		Target	Realization	Percentage
1.	2019	54.444	54.465	100,04%
2.	2020	56.454	55.936	99,08%
3.	2021	57.788	57.822	100,06%
4.	2022	60.458	62.833	103,93%
Total		299.144	231.056	403,11%
No.	Year	Sales of Electricity (GWh)		
		Target	Realization	Percentage
1.	2019	211.555	211.141	99,80%
2.	2020	227.445	223.134	98,10%
3.	2021	234.088	234.618	100,23%
4.	2022	235.666	234.618	99,56%
Total		908.754	903.511	397,69%
No.	Year	Electricity Production (GWh)		
		Target	Realization	Percentage
1.	2019	245.668	245.888	100,09%
2.	2020	266.214	254.660	95,66%
3.	2021	268.524	267.085	99,46%
4.	2022	268.500	278.941	103,89%
Total		1.048.906	1.046.574	399,1%
No.	Year	Number of Customers (People)		
		Target	Realization	Percentage
1.	2019	64.476.201	64.465.223	99,98%
2.	2020	69.458.211	68.068.283	98,00%
3.	2021	71.945.621	71.917.397	99,96%
4.	2022	76.004.658	75.705.614	99,61%
Total		281.884.691	280.156.517	397,55%
No.	Year	Network Shrinkage (%)		

		Target	Realization	Percentage
1.	2019	6,50	8,50	130,77%
2.	2020	8,00	8,75	109,39%
3.	2021	9,50	9,51	100,11%
4.	2022	9,40	9,32	99,15%
Total		33,4%	36,08%	439,42%
No.	Year	SAIFI (Kali)		
		Target	Realization	Percentage
1.	2019	8.00	8.54	106,75%
2.	2020	9.65	12.65	131,09%
3.	2021	9.00	9.90	110,00%
4.	2022	10.00	11.51	115,10%
Total		36.65	42.6	462,94%

Source: Planning Section of PT. PLN (Persero) West Java Distribution Main Unit, 2023

Based on the data shown in table 1, it is known that over all the employee's work results show a performance that is still quite good. This is shown through the work results of various company performance achievement indicators that have met the goals that have been set. Even so, it seems that not all indicators show satisfactory performance. In fact, for performance indicators based on Connected Power and Network Loss/Unsold Energy Loss, the realization of work results actually shows a decreasing percentage value from year to year. Conditions like this show that not all employees who work at this company are able to show their best work performance results, so that in the end it has a negative impact on the achievement of the company's overall performance.

The opinion expressed by Rivai (2015) related to employee performance is the result or level of success of a person as a whole during a certain period in carrying out tasks compared to various possibilities, such as work result standards, targets, or targets and criteria that have been determined in advance and agreed upon together. Meanwhile, Wibowo (2017) defines employee performance as what is done and how to do it. Sedarmayanti (2018) argues that employee performance is fulfilling or carrying out a vow, the results of workers, organizational processes, proven concretely, perfecting responsibilities, measurable, and comparable to predetermined standards. Several dimensions and indicators used in measuring the good or bad results of employee performance, including (Griffin et al., 2007): 1) Proficiency, which is a description of the extent to which an individual meets the requirements of a predetermined role; 2) Adaptivity, which is a description of the extent to which a person can adapt to changes in the work system carried out by overcoming, responding to, and supporting changes that occur within the organization; and 3) Proactivity, which is a description of the extent to which individuals take action independently to anticipate or initiate changes in work systems or work roles.

It should be noted that increasing employee performance can be influenced by various factors. One of the influencing factors is work motivation. This is proven through previous studies by Farizki, M. R., & Wahyuati, A. (2017), Supriyanto, H., & Mukzam, M. D. (2018), and Hanafi, B. D., & Yohana, C. (2017) which concluded that work motivation has a significant effect on employee performance. However, not always someone who has high work motivation can show better work results. This is shown by a study by Sumiati, M., & Purbasari, R. N. (2019) which states that there is no effect of work motivation on employee performance.

Robbins & Judge (2014) define work motivation as the willingness to undertake high-level efforts to achieve organizational goals conditioned by the ability of efforts to meet certain individual needs. Meanwhile, another opinion regarding the definition of work motivation is conveyed by Siagian (2014) who defines it as a tendency (a trait that is the subject of conflict) in a person that generates support and directs his actions. Several dimensions and indicators used in measuring the high or low work motivation possessed by a person, including (Hasibuan, 2014): 1) Employee status in the organization, namely the extent to which the agency provides a clear status; 2) The relationship between an individual and his superiors, namely the level of harmony of the individual's relationship with his superiors; 3) The relationship between a person and his colleagues, namely the level of good communication with his colleagues; 4) Supervisory techniques applied by supervisors, namely the level of

accuracy of supervisory techniques applied by supervisors; 5) Organizational policies, namely the level of accuracy of organizational policies; 6) Administrative system in the organization, namely the level of accuracy of the administrative system in the agency; 7) Working conditions, namely the level of support for working conditions in the agency; and 8) Applicable reward system, namely the level of accuracy of the applicable reward system in the agency.

Another factor that contributes to improving employee performance is compensation. If the compensation given to employees is felt to be fair and appropriate, then employee performance will also improve. This is proven by previous research findings which state that compensation is one of the factors that can significantly influence improving employee performance (Sari, W. P. I., Jamaluddin, J., Saleh, S., & Arhas, S. H., 2020; Siyum, A. H., 2020; Njoroge, S. W., & Kwasira, J., 2015; Darma, P. S., & Supriyanto, A. S., 2017). However, the amount of compensation given to employees does not always have an effect on improving employee work performance at work. As stated by Rinny, P., Purba, C. B., & Handiman, U. T. (2020) who concluded that partial compensation does not always affect employee performance.

Defined by Hasibuan (2018), that compensation is all income in the form of money, direct or indirect goods received by employees as compensation for services provided to the company. Another definition conveyed by Rivai (2016) states that direct compensation is compensation with direct financial payments in the form of salaries, wages, incentives, commissions, and bonuses. Several dimensions and indicators that are used as measurements in assessing the effectiveness of compensation, including (Mangkunegara, 2015): 1) Payment level, where the level of compensation payment can be given high, average, or low depending on the condition of the company which means that the level of payment depends on the company's ability to pay for its employees' services; 2) Payment structure related to average pay, level of payment and job classification in the company; 3) Compensation payment methods are divided into two, including: a) Payment methods based on time (per hour, per day, per week, per month); b) Payment methods based on profit sharing; 4) Determination of individual payments based on the average level of payment, level of education, length of service and employee work performance; 5) Payment control, namely direct and indirect control of work costs with the following roles: a) Developing compensation standards and improving their functions; b) Measuring results that conflict with appropriate standards; c) Straightening changes in wage payment standards.

It is also known that a leader who is able to support the development of new ideas and take an innovative approach to his members can have an impact on improving the performance of the individual or its members. This is proven through a study by Djuraidi, A., & Laily, N. (2020) which states that transformational leadership has been able to direct and optimize employee abilities to achieve company goals. However, other research findings actually show that transformational leadership style does not have a significant effect on employee performance. As expressed by Setiawan, E. Y. (2015) who stated that transformational leadership style does not have a significant effect on employee performance at PT. ISS Indonesia at the National Hospital Surabaya.

It is stated that transformational leadership is a leader who is able to optimally transform organizational resources, consisting of human resources, facilities, funds, and external factors, in order to achieve meaningful goals in accordance with predetermined targets with several indicators, such as providing renewal/example, encouraging member performance, harmonizing the work environment, empowering members, acting on a value system, and improving abilities and being able to overcome difficult problems (Aprilinda, D., & Budiman, A. P., 2021). Meanwhile, Jumiran, J., Novitasari, D., Nugroho, Y., Sutardi, D., Sasono, I., & Asbari, M. (2020) concluded that transformational leadership is a component of the process of conveying an organizational vision whose key to success is highly dependent on a leader's ability to convince his members to meet all the targets that have been set, and with the best achievement in the form of giving opportunities to his followers to develop their skills, so that they are able to generate internal motivation, as well as an attitude of commitment to work for followers caused by the support system, namely a leader figure who inspires his followers. Some dimensions and indicators of transformational leadership, including (Bernard M. Bass in Shalahuddin, S., 2015): 1) Inspirational motivation, namely transformational leaders who have a clear vision, and are able to articulate their vision to members; 2) Intellectual stimulation, namely transformational leaders who not only challenge the status quo, but also encourage creativity among their members, and are able to encourage their members to explore new ways of doing things

and new opportunities to learn; 3) Individualized consideration, namely transformational leaders who are able to keep the lines of communication open, so that their members have the freedom to share ideas and provide direct recognition of the unique contributions of each member; and 4) Idealized influence, namely transformational leaders who serve as role models for their members.

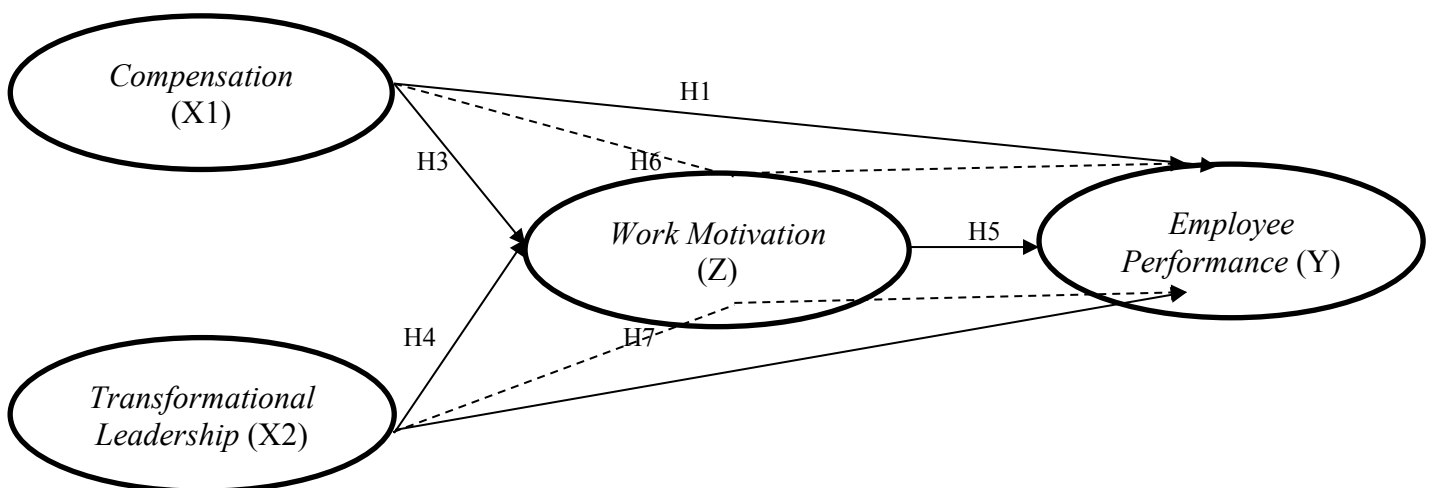
Based on this explanation, the author is interested in conducting research with the title: "The Influence of Compensation and Transformational Leadership on Employee Performance Mediated by Work Motivation in Employees of PT PLN (Persero) West Java Distribution Main Unit."

2. Method

This study uses a quantitative approach that aims to test the hypothesis with statistical methods as a way to process and analyze data. When viewed from its type, this study is included in associative research that aims to determine the influence between the variables studied. In this study, the unit of analysis is the employees of PT PLN (Persero) West Java Distribution Main Unit. Meanwhile, the purpose of this study is to determine how big the role of work motivation is in mediating the relationship or influence between compensation and transformational leadership on employee performance.

This study consists of 3 (three) main variables studied, including 2 (two) independent variables, namely compensation (X_1) and transformational leadership (X_2) variables, one dependent variable, namely employee performance (Y), and one mediating variable, namely work motivation (Z). Arikunto (2017) defines population as the entire research subject. The population in this study is all employees of PT PLN (Persero) West Java Distribution Unit totaling 172 people and with the number of samples taken as many as 120 respondents calculated using the Slovin formula. Meanwhile, the sampling technique used is probability sampling with a simple random sampling type.

For data collection techniques used in this study were carried out in various ways, including: 1) Distribution of questionnaires distributed to employees of PT PLN (Persero) West Java Distribution Unit which were distributed by directly distributing the questionnaires to respondents. The contents of the questionnaires distributed contained several questions with five different possible answer choices, and the scale used was a Likert scale with a value weight starting from a scale of 1 to 5; 2) Interviews conducted by asking trusted sources directly with the aim of obtaining useful information in this study; 3) Documentation and literature studies conducted by collecting library data and data recommended by the organization. For data processing and analysis techniques, path analysis is used, calculated with the help of the SPSS program.



Picture 1. Conceptual Framework

3. Results

3.1. Simultaneous Hypothesis Testing (F Test)

Structure 1: Compensation and Transformational Leadership on Work Motivation

Table 2: Simultaneous Influence Hypothesis Test with F Test: The Influence of Compensation (X_1) and Transformational Leadership (X_2) on Work Motivation (Z)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	612.223	2	306.111	64.489	.000 ^b
	Residual	555.369	117	4.747		
	Total	1167.592	119			

a. Dependent Variable: Work Motivation

b. Predictors: (Constant), Transformational Leadership, Compensation

Source: Hypothesis Test Results, 2024

Based on Table 2 shows the F_{count} value of 64.489 and the Sig. value is 0.000. It is known that the F_{count} value is $64.489 > F_{\text{table}} 3.074$ and the Sig. value is $0.000 < 0.05$, then H_0 is rejected H_a is accepted, meaning that Compensation and Transformational Leadership together have a positive and significant effect on Work Motivation.

Structure 2: Compensation, Transformational Leadership, and Work Motivation on Employee Performance

Table 3: Simultaneous Influence Hypothesis Test with F Test: The Influence of Compensation (X_1), Transformational Leadership (X_2) and Work Motivation (Z) on Employee Performance (Y)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	452.558	3	150.853	36.870	.000 ^b
	Residual	474.609	116	4.091		
	Total	927.167	119			

a. Dependent Variable: Employee Performance

b. Predictors: (Constant), Work Motivation, Transformational Leadership, Compensation

Source: Hypothesis Test Results, 2024

Based on Table 2 shows the F_{count} value of 36.870 and the Sig. value is 0.000. It is known that the F_{count} value is $36.870 > F_{\text{table}} 2.683$ and the Sig. value is $0.000 < 0.05$, then H_0 is rejected H_a is accepted, meaning that Compensation, Transformational Leadership, and Work Motivation together have a positive and significant effect on Employee Performance.

3.2. Partial Hypothesis Test (t-Test)

Table 4: Partial Effect Hypothesis Test with t-Test: Effect of Compensation (X_1) and Transformational Leadership (X_2) on Work Motivation (Z)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.952	3.652		.809	.420
	Compensation	.553	.065	.553	8.459	.000
	Transformational Leadership	.381	.069	.362	5.535	.000

a. Dependent Variable: Work Motivation

Source: Hypothesis Test Results, 2024

Table 5: Partial Effect Hypothesis Test with t-Test: Effect of Compensation (X_1), Transformational Leadership (X_2) and Work Motivation (Z) on Employee Performance (Y)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	10.039	3.400		2.953	.004
	Compensation	.073	.077	.082	.948	.345
	Transformational Leadership	.431	.072	.459	5.999	.000
	Work Motivation	.268	.086	.300	3.117	.002

a. Dependent Variable: Employee Performance

Source: Hypothesis Test Results, 2024

Direct Hypothesis (Direct Effect):***Compensation influences Employee Performance***

Based on Table 4 shows the coefficient value of 0.073 (positive), the t-value of 0.948 and the Sig. value is 0.345. It is known that the t-value of 0.948 < t-table 1.658, the Sig. value is 0.345 > 0.05, and the direction of the coefficient is positive, then it is concluded that Ho is accepted Ha is rejected, meaning that Compensation has a positive and insignificant effect on Employee Performance (Hypothesis Rejected).

Transformational Leadership influences Employee Performance

Based on Table 4 shows the coefficient value of 0.431 (positive), the t-value of 5.999 and the Sig. value is 0.000. It is known that the t-value of 5.999 > t-table 1.658, the Sig. value is 0.000 < 0.05, and the direction of the coefficient is positive, then it is concluded that Ho is rejected Ha is accepted, meaning that Transformational Leadership has a positive and significant effect on Employee Performance (Hypothesis Accepted).

Compensation influences Work Motivation

Based on Table 3 shows the coefficient value of 0.553 (positive), the t-value of 8.459 and the Sig. value is 0.000. It is known that the t-value of 8.459 > t-table 1.658, the Sig. value is 0.000 < 0.05, and the direction of the coefficient is positive, then it is concluded that Ho is rejected Ha is accepted, meaning that Compensation has a positive and significant effect on Work Motivation (Hypothesis Accepted).

Transformational Leadership Influences Work Motivation

Based on Table 4 shows the coefficient value of 0.381 (positive), the t-value of 5.535 and the Sig. value is 0.000. It is known that the t-value of 5.535 > t-table 1.658, the Sig. value is 0.000 < 0.05, and the direction of the coefficient is positive, then it is concluded that Ho is rejected Ha is accepted, meaning that Transformational Leadership has a positive and significant effect on Work Motivation (Hypothesis Accepted).

Work Motivation influences Employee Performance

Based on Table 4 shows the coefficient value of 0.268 (positive), the t-value of 3.117 and the Sig. value is 0.002. It is known that the t-value of 3.117 > t-table 1.658, the Sig. value is 0.002 < 0.05, and the direction of the coefficient is positive, then it is concluded that Ho is rejected Ha is accepted, meaning that Work Motivation has a positive and significant effect on Employee Performance (Hypothesis Accepted).

3.3. Mediation Hypothesis Test

Table 6: Mediation Testing with Sobel Test

	Indirect Influence	Z Sobel	P - Values
Indirect Influence X1 --> Z ---> Y	0,148204	2,92615709	0.00343178
Indirect Influence X2 --> Z ---> Y	0,102108	2,71390655	0.00664949

Source: Hypothesis Test Results, 2024

Indirect Hypothesis (Indirect Effect):

Structural Equation 1: $Z = a_1 + b_{1.1}X_1 + b_{1.2}X_2 + e$

$$Z = 2.952 + 0.553X_1 + 0.381X_2 + e$$

Structural Equation 2: $Y = a_2 + b_{2.1}X_1 + b_{2.2}X_2 + b_{2.3}X_3 + e$
 $Y = 10.039 + 0.073X_1 + 0.431X_2 + 0.268X_3 + e$

Based on the Sobel Test Results in Table 6, the results obtained were:

Work Motivation mediates the influence between Compensation and Employee Performance

The indirect effect of Compensation (X_1) on Employee Performance (Y) through Work Motivation (Z) is 0.148204. It is known that the Sobel Z value = 2.926 > 1.96 and the Sobel P value = 0.0034 < 0.05, meaning that Work Motivation (Z) is positive and significantly mediates the effect between Compensation (X_1) on Employee Performance (Y) (Hypothesis Accepted).

Work Motivation mediates the influence between Transformational Leadership and Employee Performance

The indirect effect of Transformational Leadership (X_2) on Employee Performance (Y) through Work Motivation (Z) is 0.102108. It is known that the Sobel Z value = 2.714 > 1.96 and the Sobel P value = 0.0066 < 0.05, meaning that Work Motivation (Z) is positive and significantly mediates the effect between Transformational Leadership (X_2) on Employee Performance (Y) (Hypothesis Accepted).

Table 7: Summary of Results of Proposed Research Hypothesis Testing

Hypothesis	Research Hypothesis	Test Results
H ₁	<i>Compensation has a positive and insignificant influence on Employee Performance</i>	Hypothesis Rejected
H ₂	<i>Transformational Leadership has a positive and significant influence on Employee Performance</i>	Hypothesis Accepted
H ₃	<i>Compensation has a positive and significant effect on Work Motivation</i>	Hypothesis Accepted
H ₄	<i>Transformational Leadership has a positive and significant influence on Work Motivation</i>	Hypothesis Accepted
H ₅	<i>Work Motivation has a positive and significant effect on Employee Performance</i>	Hypothesis Accepted
H ₆	<i>Work Motivation mediates the positive and significant influence between Compensation and Employee Performance.</i>	Hypothesis Accepted
H ₇	<i>Work Motivation mediates the positive and significant influence between Transformational Leadership and Employee Performance.</i>	Hypothesis Accepted

Source: Hypothesis Test Results, 2024

4. Discussion

4.1 Compensation has a positive and insignificant influence on Employee Performance

The results of the study indicate that there is a positive and insignificant influence shown by Compensation on Employee Performance. This means that compensation is not always the most important factor in efforts to improve employee performance. When an organization is able to provide compensation that is felt to be fair and competitive for its employees, then its employees tend to feel more satisfied with their work which results in better performance. In addition, when employees feel financially appreciated while working, then employees are often more committed and productive, and motivate themselves to work better by improving the quality of their work and achieving the targets that have been set.

The findings of this study seem to have different conclusions from several previous studies. As stated by Darma, P. S., & Supriyanto, A. S. (2017) through the results of their tests which stated that compensation in the form of salary, wages, bonuses, facilities, travel programs and holiday allowances directly has a positive and significant effect on employee performance. This means that along with the increasing compensation given by the company

to its employees, the performance of its employees will also increase. Likewise, the opinion expressed by Saman, A. (2020) who concluded that compensation has a positive and significant effect on employee performance.

4.2. Transformational Leadership has a positive and significant influence on Employee Performance

The results of the study indicate that there is a positive and significant influence shown by Transformational Leadership on Employee Performance. This means that employee performance can be influenced by transformational leadership. Transformational leadership is a leadership style characterized by a leader who is able to inspire and motivate employees, create an attractive vision, and facilitate the personal and professional development of employees. When a leader is able to inspire and motivate employees with a clear and challenging vision, employees who are inspired by the vision tend to have higher work enthusiasm and are always involved in their work, so that their performance also increases. In addition, when a transformational leader is able to increase employee satisfaction with their work, employees tend to be more productive and perform better at work, and encourage employees to work more creatively who are able to find new ideas and find innovative solutions in solving work problems.

The findings of this study have similar conclusions to several previous studies. One of the research findings put forward by Thamrin, H. M. (2012) which states that transformational leadership has a positive influence on organizational commitment and employee performance. In his research, it is stated that transformational leadership can be recommended as a leadership model that can be applied to an organization based on the desire to make the organization grow, or as a result of the emergence of dissatisfaction or dissatisfaction with the current conditions. In addition, this leadership model can also be maintained by using a flexibility approach that aims to integrate the desires of employees and other stakeholders into the transformational leadership model. Another opinion was expressed by Rivai, A. (2020) who said that transformational leadership has an effect on improving employee performance. Transformational leadership itself is a leadership model for a leader who is able to motivate his members to be able to work better by emphasizing behavior to help transformation between employees/individuals and organizations/companies.

4.3. Compensation has a positive and significant influence on Work Motivation

The results of the study indicate that there is a positive and significant influence shown by Compensation on Work Motivation. Providing appropriate compensation can be one of the factors that contribute to increasing employee work motivation. If a company can provide compensation with an adequate and fair amount to each employee, in the sense that the compensation received is in accordance with the contribution given to the company, then the employee tends to feel more satisfied with his work which has an impact on increasing work motivation to show better work results. Often, employees who receive compensation that is felt to be fair and appropriate, then the employee tend to have high work motivation to work better in order to achieve the goals that have been set, making it possible for the employee to get a reward with a much larger amount. Then, it is also known that providing competitive compensation can help the company to retain its employees because the employee feels that the compensation paid has been done in a fair manner, and the benefits of the compensation are obtained, so that their loyalty to the company becomes higher.

The findings of this study have similar conclusions to the results of research by Negash, R., Zewude, S., & Megersa, R. (2014) which stated that all compensation variables consisting of payment, promotion, recognition, working conditions and benefits have a significant relationship to employee work motivation. This shows that if the compensation offered to employees is felt to be commensurate with their work contribution to the company, employee work motivation will increase. A similar opinion was expressed by Laras, T., Jatmiko, B., Susanti, F. E., & Susiati, S. (2021) who stated that there is a positive relationship between compensation and employee work motivation. This means that the better the compensation given, the higher the employee work motivation.

4.4. Transformational Leadership has a positive and significant influence on Work Motivation

The results of the study indicate that there is a positive and significant influence shown by Transformational Leadership on Work Motivation. This means that in various situations, transformational leadership can be one of

the factors that influence the increase in employee work motivation. Transformational leadership is always characterized by a leader who is able to inspire, motivate, and stimulate his members to show the best work performance and go beyond his personal interests. Often, a leader who is able to create a vision that inspires and touches the emotions of his members can increase the work motivation of his members, as well as help his members to feel more involved and have a definite purpose in the work that is their responsibility. In addition, a transformational leader is someone who is able to provide support and stimulate new ideas from his members, thus encouraging his members to work more creatively and innovatively.

The findings of this study have similar conclusions to the opinion expressed by Yusup, A., & Maulani, I. E. (2023) through their study which stated that transformational leadership has a positive effect on employee motivation. The results of their study show that transformational leaders have better leadership qualities compared to other leaders who are characterized by people who have a clear and inspiring vision, are authoritative, support employee development, and provide constructive feedback and recognition. Good leadership qualities allow this type of leader to motivate their members to work more effectively. Then, increasing employee work motivation can occur if employees feel appreciated and given the opportunity to grow and develop which is one of the criteria for transformational leaders. It is also stated that recognition and constructive feedback given by transformational leaders can increase employee work motivation. Similar to other opinions from Ekhsan, M., & Setiawan, I. (2021) which state that transformational leadership style has a significant positive effect on work motivation.

4.5. Work Motivation has a positive and significant influence on Employee Performance

The results of the study indicate that there is a positive and significant influence shown by Work Motivation on Employee Performance. This shows that the good or bad results of employee performance can depend greatly on how much work motivation the employee has in an effort to complete his work well. A person who has high work motivation tends to be able to work harder and more efficiently, so that the work that must be done can be completed well and in a shorter time, and also has a direct impact on increasing work productivity. In addition, someone who is motivated to work harder tends to be able to show better quality work performance because the employee becomes more careful and committed to showing high quality work when working.

The findings of this study have similar conclusions to several previous studies. This is shown through a study by Fahriana, C., & Sopiah. (2022) which examines the influence of work motivation factors on employee performance with the conclusion that someone who has a positive attitude and high work motivation tends to be more capable of making that person an employee who is able to perform well. Another study by Chien, G. C., Mao, I., Nergui, E., & Chang, W. (2020) confirmed the positive relationship between work motivation and employee performance. The findings of their study identified 3 (three) work motivations that significantly influenced employee self-perceptions of work performance consisting of financial motivation, internal self-concept, and internalization of goals. In his study, it was stated that employees who considered themselves to have better performance, namely when employees were more motivated to work through financial rewards and incentives, driven by achievement, and able to identify organizational values and culture.

4.6. Work Motivation mediates the positive and significant influence between Compensation and Employee Performance

The results of the study indicate that there is a positive and significant influence shown by Compensation on Employee Performance mediated by Work Motivation. This shows that compensation has an important role in efforts to improve employee work motivation which ultimately results in improving employee performance at work. If an organization is able to provide compensation that is felt to be comparable to the contribution made by employees to their organization, then the employees tend to be more motivated to show better work performance results. Thus, work motivation can be a factor that mediates the relationship between compensation and employee performance.

The findings of this study have similar conclusions to the results of previous studies. This is shown through a study by Efendi, R., Rifa'i, M. N., Bahrin, K., Milla, H., & Suharmi, S. (2020) which concluded that work motivation can mediate the relationship between compensation and employee performance. Likewise, the opinion expressed

by Syamsuddin, R. A., Pratama, A., Sunarsi, D., & Affandi, A. (2021) which states that compensation indirectly through work motivation which acts as a mediator variable has a significant influence on employee performance. This shows that along with the increasing amount of compensation received by employees, the higher the level of employee work motivation which ultimately affects the improvement of employee performance.

4.7. Work Motivation mediates the positive and significant influence between Transformational Leadership and Employee Performance

The results of the study indicate that there is a positive and significant influence shown by Transformational Leadership on Employee Performance mediated by Work Motivation. Work motivation can function as a variable that mediates the relationship between transformational leadership and employee performance. This means that transformational leaders influence the level of employee work motivation that is getting higher, through inspiration, support, and development, which ultimately encourages employees to work better and more effectively. When employees feel inspired and motivated by the vision formulated by their leaders, then the employees tend to have a higher work spirit to complete their work. Likewise, when leaders can provide support in the form of positive feedback and recognition to their employees, then employee satisfaction with their work becomes higher which has an impact on increasing motivation to work better.

The results of this study have similar conclusions to several previous studies. One of them is the research findings of Dewantoro, A. Q. (2023) which revealed that improving employee performance through transformational leadership needs to involve other mediating variables, namely work motivation. This shows that there is an indirect relationship between transformational leadership and improving employee performance mediated by employee motivation. It is also stated that increasing employee performance through the implementation of transformational leadership can be accompanied by effective work motivation. A similar opinion was expressed by Bana, A. (2016) through his research findings which stated that transformational leadership indirectly has a positive and significant effect on employee performance mediated by work motivation. This means that the proper implementation of transformational leadership can create a higher level of work motivation, which also has an impact on higher employee performance. Thus, his research findings show that work motivation plays an effective role in mediating the relationship between transformational leadership and employee performance. With high work motivation as a mediator, transformational leadership can encourage employees to improve their work performance.

5. Conclusion

Based on the results of the research and discussion, it is concluded that: 1) Compensation has a positive and insignificant effect on Employee Performance; 2) Transformational Leadership has a positive and significant effect on Employee Performance; 3) Compensation has a positive and significant effect on Work Motivation; 4) Transformational Leadership has a positive and significant effect on Work Motivation; 5) Transformational Leadership has a positive and significant effect on Work Motivation; 6) Work Motivation (Z) positively and significantly mediates the effect between Compensation (X1) on Employee Performance (Y); 7) Work Motivation (Z) positively and significantly mediates the effect between Transformational Leadership (X2) on Employee Performance (Y).

It should be noted that this study still has some limitations in its writing. Therefore, in order for this research to be carried out better in the future, further research needs to be conducted by considering several things as follows: 1) Further research needs to add several other variables that are suspected of influencing the improvement of employee performance results while working, including variables of discipline, workload, training effectiveness, work life balance, job placement, and others; 2) For the analysis unit studied, it is better to involve more similar companies, so that the number of respondents involved becomes even greater, or other companies with different types of businesses are needed.

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