STRUCTURAL EQUATION MODEL OF GOLD MINING FIRM PERFORMANCE IN EASTERN AFRICAN COMMUNITY

NAVIDREZA AHADI

A DISSERTATION SUBMITTED IN FULFILLMENT OF REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN INDUSTRIAL BUSINESS ADMINISTRATION

KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG BUSINESS SCHOOL

KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG

2022

KMITL-2022- KBS-D-128-001

Dissertation Title	Structural Equation Model of Gold Mining Firm Performance in Eastern African Community
Student	Mr. Navidreza Ahadi
Student ID	59611096
Degree	PhD in Industrial Business Administration
Program	Industrial Business Administration (International Program)
Year	2022
Disseration Advisor	Dr. Sorasak Tangthong

ABSTRACT

This research empirically aim to investigate performance of gold mining firms in Eastern African Community (EAC). The objective of this study is investigate relations between applicable variables and concepts that influence gold mining Firm Performance and to develop a new structural equation model for Firm Performance with financial metrics to enhance gold mining managerial practices in the Eastern African Community. The population of this study consist of 179 precious mineral mining companies in the Eastern African Community. The sample included 390 top executives from 65 mining companies, selected based on stratified random sampling across 6 countries in EAC. Questionnaires were sent to executives and adequately completed. Statistical analysis of this study, include standard deviation, percentage, validity and reliability of the questionnaires, confirmatory factor analysis (CFA) along with statistical factors for model fit indices. The results show that Organization Environment positively influence Social Factor but Organization Environment effect is not significant toward Control System and Origination Environment positively influence Technological Innovation, Social Factor is positively related to Technological Innovation and Technological Innovation positively influence Control System while Technological Innovation positively influence Firm Performance but Control System relation to Firm Performance is not significant. The findings are in line with research main theories that suggested Technological Innovation and Organization Environment were critical factors to influence Firm Performance. According to the final modified research model and results, Technological Innovation considered as the most significant factor to influence Firm Performance, followed by Organization Environment and Social Factor.

ACKNOWLEDGMENT

I would like to acknowledge my indebtedness and render my warmest thanks to my supervisor, Asst.Prof. Dr. Sorasak Tangthong made this work possible. His friendly guidance and expert advice have been invaluable throughout all stages of the work.

I would also wish to express my gratitude to Assoc. Prof. Dr. Sudaporn Sawmong and Asst.Prof. Dr. Puris Sornsaruht, Assoc.Prof. Dr. Khanyapuss Punjaisri, Asst.Prof. Dr. Samart Deebhijarn, Dr. Ornicha Norkaew, Asst.Prof. Dr. Singha Chaveesuk, Asst.Prof. Dr. Nuttawut Rojniruttikul, Mr. Fillip Shrifi and Mr. Amirhoseein Taghipur for extended discussions and valuable suggestions. This dissertation has written at the KMITL Business School. I want to thank the KBS for providing this opportunity and supporting me during my study. I would like to express my deepest gratitude to all examiners who suggested revision until this dissertation is satisfied.

Finally I'm highly grateful to my parents, family and friends for their support and encouragement during my study.

Navidreza Ahadi

TABLE OF CONTENTS

TABLE OF CONTENTS (Continue)

TABLE OF CONTENTS (Continue)

LIST OF TABLES

Table **Page**

LIST OF TABLES (Continue)

Table **Page**

LIST OF TABLES (Continue)

Table **Page**

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1. Introduction

The mining industry is among the main factors behind the growth in the Eastern African Community (EAC). As an intergovernmental organization, EAC has promoted the mining industry and provided a better environment to attract foreign direct investment (FDI) to encourage the mining industry within this region. The investment potential is particularly significant for gold mining, as it is one of the most profitable minerals in the mining sector. Gold mining potential has attracted many small, medium, and multinational foreign and domestic firms exploring the mining industry across countries in the Eastern African Community (EAC). This chapter consist of the following topics.

1.1 Background and Significance

1.2 Problem Statement

1.3 Research Questions

1.4 Research Objectives

1.5 Scope of Research

1.6 Studied Variables

1.7 Time Frame of Research

1.8 Research Hypothesis

1.9 Research Conceptual framework

1.10 Research Benefits

1.11 Definition of Terms

1.12 Summary

1.1 Background and Significance

The East African Community (EAC) is a regional intergovernmental organization of 6 Partner States: The Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters Arusha, Tanzania. The EAC is home to 150 million citizens, of which 22% is the urban population. With a land area of 1.82 million square kilometers and a combined Gross Domestic Product of US$ 193 billion, it bears tremendous strategic and geopolitical significance and prospects for the investments and reinvigorated EAC (Matte, 2019).

As one of the fastest-growing regional economic unions, the EAC is widening and deepening cooperation among the partner states in various key spheres for their mutual benefit. These spheres include political, economic and social.

The regional integration process is in full swing, as reflected by the encouraging progress of the East African Customs Union, the establishment of the Common Market in 2010, and the implementation of the East African Monetary Union Protocol. Among various growing industries, gold mining is among the fastest performing businesses within Eastern Africa Community (Kleis, 2016).

As Eastern African nations are developing fast and growing various industries, the whole region has focused on developing mining, agriculture, and tourism industries. The mining industry has traditionally been one of the largest industries in the region despite facing various challenges such as security and infrastructure. These challenges have led mining companies facing severe difficulties in fulfilling their financial obligations, particularly precious mineral mining, as there are various sites and areas with obstacles such as lack of proper infrastructures, roads and costly operations. The gold mining firms in the Eastern African Community still lack infrastructure, advanced technologies, and skilled employees to maximize their potential, increase profitability and performance compared to other developed mining regions such as Australia, Southeast Asia, and North America, which are technologically more advanced (Mwakesi, Wahome & Ichang , 2020).

Most exploration focused on gold as one of the most valuable minerals as gold is used in various industries as a rare mineral as well as investment and jewelry manufacturing, despite the high potential in the mining industry, only a fraction of the potential regions surveyed geologically. Across the regions, geological surveys identified mineral resources that include copper, gold, iron ore, lead, manganese, zinc, large dolomite, marble, and uranium deposits in the Eastern African Community (Mpanju, 2019). Companies are actively exploring in East Africa, which is still largely underexplored, but some of the challenges faced by exploration and mining companies include a general lack of skilled workers, lack of technological implementation and insufficient infrastructure such as roads and electricity (Mwakesi, Wahome & Ichang , 2020). A large number of companies are involved in the region's mining sector, including major companies like Rio Tinto, Barrick Gold and AngloGold Ashanti as well as various medium size mining operations and Artisanal mining forms a large part of the mining sector in East Africa. Some of the region's most significant minerals include rutile, ilmenite, zircon, gold, and soda ash. Significant investment across several countries has included the opening and development of gold refineries in Rwanda and Tanzania and various gold mining investments in Tanzania and Kenya among others (Mpanju, 2019).

Furthermore, to fulfill the industry need and support firms in the mining industry, East African nations have signed agreements regarding policies and programs for mining companies to expand their cooperation and create a competitive environment for mining firms within the region. Regarding this, there are the mining Act established six types of licenses—artisanal, exploration, large-scale mining, surveillance, retention, and small-scale mining. Exploration licenses are awarded for an initial 5-year term and are renewable for an additional 2- to 5-year terms. Survey licenses are granted for a nonrenewable 2-year period. Large-scale mining licenses are awarded for 25 years and can be extended for 20 more years, and small-scale licenses are granted for a 10-year term and can be renewed for another ten years. Licenses are issued for up to 5 years for exploration and up to 6 years for mining activities. In addition to this, artisanal mining licenses must be renewed annually and can be extended to unlimited times.

The governments in EAC have set up various mining acts and tax laws to allow firms across the East Africa Community to be able to purchase shares and participate in medium and large-scale mining operations (Assessment of Mineral Regimes in the East African Community United Nations Economic Commission for Africa, 2020). Besides, there are also encouraging tax exemption, loans, and leasing site-packages for companies to help improve their operations through financing new technologies and identifying potential areas to for geological surveys and mining exploration. These permits and licenses have government support and through establishing new policies support firms to improve their performance through enhancing their control system, training their staff to promote using technologies and innovation to encourage firms and investors by increasing their growth and overall profitability (Kleis, 2016). The mineral and mining industry has been a significant part of the East Africa Community's nominal gross domestic product (GDP).

Despite the various form of mining and scales, from artisan mining to larger industrial mining projects, a significant portion of region growth depends on the mining industry in Eastern African Community. For the past decade, due to international demand, the gold mining sector has grown significantly which led to increasing mining activities across east Africa (Weerasekarage, Gayashan & Madhuranga, 2018). Eastern African Community has great potential in precious mineral mining industry as members such as Tanzania, South Sudan and Kenya have great mineral mining capacity to be further explored. Because of gold mining profitability, many international mining companies create joint ventures with local firms in EAC for mineral exploration, mining, and refining. Besides medium and large mining firms, a vast amount of overall gold production is still dependent on artisanal miners, although, in general, goes to larger gold trading companies where they purify the gold and make it suitable for commercial usage (Mpanju, 2019). Commodity Review Metals Gold In 2014, mentioned permits to explore for gold in East African Community, among various companies facilitating the mining projects by carrying out field mapping activities, conducting feasibility studies, satellite imagery, and trial mineral mining (Yager, 2017).

Although mineral, especially gold, is among the essential commodities in the mining industry, security issues in various parts of the world, especially in Africa, have consistently disrupted gold mining operations. In April 2013, the governments of Sudan and South Sudan resumed gold production and transport through the new roads and infrastructure in disputed areas owned by Sudan; after about 15 months, firms in the region paused their operations because of conflict of interest in a disputed area between the two Governments. Gold production was partially halted again in many areas in December 2013 and 2014 because of the armed conflict between various proxies in South Sudan. Gold output decreased by about one-third after fighting erupted, and the only functioning fields in different blocks of the site in the Paloch region, located in the State of Upper Nile. In recent years, various companies paused their investment or appeared to have canceled a plan to build a gold refinery in multiple states, including Akon County in the State of Warrap, approved by the Cabinet in 2010 in South Sudan.

Various projects have to be put on hold in EAC, including large mineral refineries regarding armed conflict and security issues. The cancellation was attributed to the distance between the location of the proposed refinery and the nearest gold mines. However, most countries in The East Africa Community are actively involved in signing agreements with neighboring countries to set up additional infrastructure and increase security to support its current and future gold output (Mwakesi, Wahome & Ichangi, 2020). The armed conflict in the country, which started in 2013 and continued throughout 2014, hindered the development of the mineral sector of the East Africa Community, especially in South Sudan, while other members such as Kenya and Uganda are more stable.

The lack of infrastructure in the country, especially power plants and roads, could limit the start of large-scale mining in the country in the near future as the mining industry is becoming more challenging due to the complexity of its operations, significant investment and operation costs, as well as lack of resources. The other significant challenges for mining firms in EAC include lack of control and monitoring systems, lack of essential technologies, growing need for technical training for the staff and lack of skilled employees. Therefore, for gold mining firms to overcome obstacles and fulfill their financial goals, there is a growing need for technological implementation to enhance their operations, market value, and profitability (Nkundabanyanga, 2016).

Furthermore, as the mining industry in EAC is going through rapid modernization, there is still a large artisan mining sector. Many stakeholders believe it's challenging to support, aid, and promote technology usage among artisan miners. The problems include artisanal miner's lack of technical training to use new technologies and its potential benefits. Other challenges include tensions between mining companies and local communities living in areas of mineral deposit and exploration, for example, jobs opportunities, potential revenue and general development aspirations of these communities are not yet fulfilled. Many communities in various African regions have also expressed concern about displacement/relocation, land compensation, and the share of mineral benefits. There are locations with potential gold deposits and goldmines in which the government forcibly relocated people who refused payment as their compensation to relocate to other areas. In general, many cases show that in calculating compensation amounts, the government did not consider the non-economic value of the land, which disenchanted local authorities (Mpanju, 2019).

Involving information technology in operations services related to mining needs to be improved. This requires countries to develop their capacity for promoting science, technology, and innovation, which can be measured in terms of the availability of scientists and engineers, the quality of scientific research institutions, cooperation between universities and industries, expenditure on research and development in the private sector, and procurement of advanced technology products by governments. Lack of technology usage such as technical software exists in various mining operations and companies across Africa. Many mining firms now look into adopting essential technologies and innovative strategies to improve their performance to sustain and expand their operations (Yager, 2017).

Various policies also aim to promote effective, affordable, and secure technologies for artisanal and small-scale miners by enabling the collection and distribution of information about relevant mining tactics, information and training through offering extension services and technology demonstrations. It also points out the need to facilitate and support the establishment of representative associations of artisanal and small-scale miners and assist them in tax compliance (Mpanju, 2019).

Furthermore, specific mining commands and licenses are characterized through social and labor policies, and more private-sector ownership and taxation systems. In addition, the applicant is required to provide evidence of submission and approval of an environmental and social impact ,assessment report and an environmental management plan, as well as a document providing details of the applicant's proposals for" socially responsible community investments.

In mining businesses, innovation remains a challenging task, despite the enormous management expenditure in time and resources, particularly in east Africa. The incorporation of technological change into the enterprise poses several challenges with management and the process of technological adaptation within the projects. Training employees and having a safe, productive organizational environment often enhances through a control management system and technological advancement help managers with better equipment to manage, improve, make a decision more effectively and overcome the obstacles that usually exist in projects.

1.2 Problem Statement

The gold mining industry is among the most expensive sectors to operate, primarily in today's competitive environment; therefore, mining companies need to overcome impediments and challenges to fulfill their financial obligations. Various researchers indicate a significant portion of gold mining companies in EAC are not using improved technologies, procedures, and training as well as lack of a dynamic, safe organization environment necessary to sustain and increase their profitability, as gold mines are becoming exhausted through limited gold deposits and ever-growing demand from the international gold market, it is, therefore, vital for gold mining firms to improve their performance to be able to endure their market value (Mcnamee, Pearson, & Boer, 2015). Gold mining companies in EAC have more traditional approaches in terms of their operations and management both from social and technological aspects, which create challenges for the gold mining industry in EAC (Mcnamee, Pearson, & Boer, 2015). It is becoming essential for mining companies to sustain and increase their performance financially to withstand their expensive operations, expand and overcome numerous challenges in the gold mining industry in EAC. This along with a few previous academic research regarding gold mining management practices in the Eastern African Community due to the lack of infrastructures, development, and security issues in certain areas within EAC. The lack of research exists particularly in understanding the impact of information technology, the potential of software amendment, employee's training need and proficiency, organization environment, and control systems efficiency on gold mining firm performance.

This requires a systematic approach toward their management and control system adopting new technologies and operations to increase profitability, growth, and market value. Therefore, mining companies' financial health is decisively vital as firms expand operations and mines become exhausted and even more costly to operate. There is a growing need to engross innovation and technologies to support the management team and utilize the efficient control system implemented within the firm to help the organization sustain and improve its performance. Furthermore, financial metrics such as growth and profitability are critical factors in sustaining gold mining businesses (Ledwaba & Nhlengetwa, 2016). In addition, the researcher indicates there is a lack of advanced technologies, technical difficulties, and deficiency which generate obstacles in increasing the control system capabilities to improve gold mining firm performance financially in the Eastern African Community.

1.3 Research Questions

Although East Africa expands and promotes its mining industry, lacks of technological capabilities still exist in most regions. Thus, the researcher has discovered the following questions for this study:

1. How do organization environment, social factor through mediating variables of technological innovation and control system affect performance of gold mining firms in the Eastern African Community?
2. What are the applicable factors in relation to firm performance concepts for gold mining firm in the Eastern African Community?
3. How is the structural equation model of variables that is consistent with empirical research data of gold mining practices affect firm performance financially in the Eastern African Community?

1.4 Research Objectives

1. To study the relations of organization environment, social factor through mediating variables of technological innovation and control system that affect performance of gold mining firm in Eastern African Community.
2. To study the applicable factors in relation to firm performance concepts for gold mining firm in Eastern African Community.
3. To develop a structural equation model of variables affecting gold mining firm performance with financial metrics in the Eastern African Community.

1.5 Scope of Research

Population and Sample

Mining projects in East Africa

African mining IQ (AMIQ) has 12 countries involved in mining, making up its East African region combined with 450 mining projects. A total population of 179 local and multinational mineral mining companies detailed information on the following mining companies within EAC: 23 in the Republics of Burundi, 31 in Kenya, 19 in Rwanda, 14 in South Sudan, 71 in the United Republic of Tanzania, and 21 in Uganda in the Eastern African Community (Projectsiq.co.za, 2020). Furthermore, from the total of 179 companies, 65 gold mining companies selected through stratified random sampling and 6 executive positions selected as the main decision makers in each company which in total comprises 390 mining executives. Key positions in each company include vice president, sales manager, chief executive officer (CEO), chief finance officer (CFO), chief of human resource, operational executives.

1.6 Studied Variables

Exogenous Latent Variable: Organization Environment,

Mediating Latent Variables: Social Factor, Technological Innovation, Control System

Endogenous Latent Variable: Firm Performance

Observant variables: 1. Environmental Comfort 2. Environmental Dynamism 3. Environmental Safety 4. Operator Proficiency 5. Training Needs 6. Social Attitudes 7. Technology Efficiency 8. Technology Reliability 9. Technology Productivity 10. Control and Information System 11 Operating Compliance 12 Capabilities 13. Profitability 14. Growth 15. Market Value.

1.7 Time Frame of Research

There are three parts to the research: the first part is a study on secondary data sources. The second and third parts involve the quantitative process of using the questionnaires online to the respondents. Finally, the questionnaires were gathered for statistical process, data analysis, and conclusion. This took place between June to October 2020. The whole process is explained in chapter 3.

1.8 Research Hypotheses

Hypothesis 1. Organization Environment Affects Social Factor of East African Gold Mining Companies.

Hypothesis 2. Organization Environment Affects Control System of East African Gold Mining Companies.

Hypothesis 3. Organization Environment Affects Technological Innovation of East African Gold Mining Companies.

Hypothesis 4. Social Factor Affects Technological Innovation of East African Gold Mining Companies.

Hypothesis 5. Social Factor Affects Control System of East African Gold Mining Companies.

Hypothesis 6. Technological Innovation Affects control system of East African Gold Mining Companies.

Hypothesis 7. Technological Innovation Affects Firm performance of East African Gold Mining Companies.

Hypothesis 8. Control system Affects Firm performance of East African Gold Mining Companies.

1.9 Research Conceptual Framework

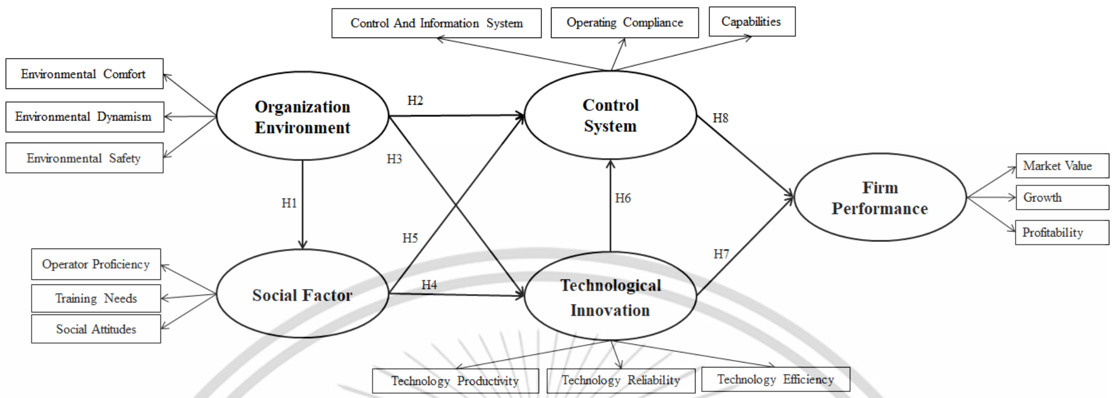

Figure 1.1. Conceptual Model for effects variables on gold mining firm performance**.**

Note: The figure shows the relations of organization environment, social factor toward mediating factors of technological innovation and control system that affect firm performance.

1.10 Research Benefits

This research contributes to organizations and academics to reassess the importance of firm financial performance in gold mining practices. It also emphasize feasible understanding toward management procedures of gold mining firms in eastern African community as one of the most important industries in the region of east Africa for researchers and mining firms. It helps academics and researchers to further understand the variables influencing gold mining firm performance financially in the Eastern African Community and to develop additional studies from it. Furthermore, it also signifies the importance of key stakeholders in improving firm performance through value-added strategies, decision making, adopting a dynamic organization environment and training and skill development for employees as well as new technological implementation and internal control system which represent any businesses that can use the conceptual model of this study in their organizations. It also benefits gold mining firms to identify more effective ways to implement these factors that are in line with their business strategies and to help companies introduce managerial practices more effectively. The results also have larger implications Eastern African Community, as the region has taken a key role in shaping the global mining industry. It also benefits gold mining firms to understand factors including organization norms, value and environment, staff training need, adapting technological innovation and efficient control system which are likely to enhance and increase their market value, profitability and ultimately leading to sustainable growth for gold mining firms and to fulfill EAC's mining potential as a whole.

1.11 Definition of Terms

Organization Environment

An organization environment is a dynamic environment where its comfort, safety, dynamism affect corporate culture, norms, values and influence employees and management behavior, therefore, affecting the organization as a whole.

Social Factor

Social Factor is the employee's social attitude and aptitude within the company and their interaction with each other, and their proficiency abilities and training to be able to cope with the company's goals and values.

Technological Innovation

Technological innovation facilitated by information technology, innovation other aspects of managing and processing information dealing with the use of electronic computers and computer software to convert, store, protect, analyze, transmit, and retrieve information to affects employee competence, operational efficiency, and system reliability and productivity.

Control System

A control system manages, commands direct, and regulates behaviors via control loops of other devices and systems to establish control between the organization and its systems to sync with the overall goals and objectives of the firm.

Firm Performance

Measuring how well a firm can use assets from its primary mode of business and generate revenue with financial metrics such as profitability to a degree which a firm actively gains a financial benefit, the market value which is firm financial assets and shares, and growth which typically occurs in the phase of creation or process of completion; it reveals the company's capacity to expand financially.

Gold Mining Firm

Gold mining firm is a local or multinational company active in gold mining exclusively or along with other precious minerals in six members of the eastern African community (EAC).

Eastern African Community

The East African Community (EAC) is a regional intergovernmental organization of 6 Partner States: The Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters Arusha, Tanzania.

1.12 Summary

Gold mining industry is among the most expensive industries to operate, yet because of its profitability and high demand for gold, is among the most attractive industries in Eastern African Community for both local and international investors. There are numerous challenges in gold mining industry in EAC which include traditional way of management, lack of proper technologies, equipment. As there are potential gold mines and areas in EAC to explore for gold deposit and there are limited gold deposits in the world. Gold mines are getting exhausted and more challenging to operate. This requires a systematic approach among managers and executives to find ways that gold mining firms can sustain themselves financially, to keep up with their costly operation, and to increase their market value to fulfill their stakeholder's interest. This research therefore focuses on identifying the certain financial performance factors and obstacles in for gold mining firms in EAC, and to present a model of casual factors that affect firm performance financially in EAC. 65 gold mining firms selected from the total of 179 firms selected through stratified random sampling and from each firm, 6 executive positions were selected. The structural equation model, IBM SPSS statistics 24 and AMOS 24 used to analyze this study.

CHAPTER 2

LITERATURE REVIEW

This chapter covers a literature review that includes articles, journals, concepts, theories and relevant research papers, and literature concerning the relationships between variables of this study, including social factor, environmental factor, technological innovation, control system, and firm performance. The literature focuses mainly on the mining and related industries and how the relationships between these variables can be applied toward firm performance within the gold mining sector. This chapter consist of the following topics.

2.1 Industry Background

2.2 Firm performance Concepts and Theories

2.3 Organization Environment Concepts and Theories

2.4 Social Factor Concepts and Theories

2.5 Technological Innovation Concepts and Theories

2.6 Control System Concepts and Theories

2.7 Related Studies

2.8 Hypothesis Development and Analysis of Relationship between Variables

2.9 Conceptual Framework

2.10 Hypothesis

2.11 Summary

2.1 Industry background

The mining industry makes an essential contribution to the GDP (Gross Domestic Product) of the East African Community (Mpanju, 2019). The mining industry needs to have efficient regulations and policies regarding the gold mining industry as having a sufficient control system is vital for environmental issues in mining sites. According to Persaud, Telmer and Costa (2017) mining companies are responsible for all aspects of social, environmental, and economic at the local communities in mining areas in their studies.

Researchers such as Hashim, Raza, and Minai (2018) and Nkundabanyanga (2016) carried out studies relating to the business environment effect of technological innovation Practices and mining companies in East Africa. They found that mining companies reported more on their organizational environment management practices than other companies because of their evident and far-reaching organizational environment impacts, making their operations more legitimate.

According to Hashim, Raza and Minai (2018) the prospect of a positive relation exist in East African companies between environmental accountability and financial performance. They found that there is indeed a positive relation between the business environment and financial performance in the mining companies in Eastern Africa. Competitiveness in the world market progressively relies on the consumers of goods, whether secondary producers, distributors, public departments, or customers, to demonstrate efficient environmental management and product design.

Therefore, the development of processes to assess the environmental impact, implement policies for enhancement and communicate the environmental performance and improvements for stakeholders are essential to future market achievement. Companies benefit financially from these activities by improving manufacturing and operating efficiency, lowering liability exposure, improving customer relations, and increasing company performance (Coffman, Vanderveen, Lee, & Schlotterbeck, 2017).

According to Barnewold and Lottermoser (2020) the trends in business environment in the East African mining sector have changed over the years significantly. In today's businesses, a company only needs to work efficiently and increase innovation and creativity in products and services to succeed in a highly competitive market. Training and technological advancement could lead to operation development and acquisition of firm goals to fulfill its potentials. The mining sector has been identified by most countries in the region as a potential catalyst for economic development, and there is a determined effort to develop the sector and to make it more attractive to investors. This has included a draft policies in several countries across east Africa to attract foreign mining companies to develop its mining sector (Mpanju, 2019).

In Rwanda, the processing of new license applications is being restructured while in Tanzania, the government established mineral trading centers in every region in order to increase efficiency reduce tax evasion and illegal exports of minerals. In Uganda, artisanal mining activities are being legalized to bring them into the tax net (Mpanju, 2019).

According to Frederick et al (2015) the difficulty of creating new products or services to ensure prosperity and long-term shareholder value through emphasizing innovation. The efficient use of manufactured capital allows businesses to be flexible, innovative and speed up product and service marketing. In addition, innovation and efficient technology can decrease errors and improve efficiency as well as sustainability. Various studies show that the future of mining and energy industries enhances the growing need for intelligent grid technologies, technological innovations, and artificial intelligence. The researcher concluded that a company needs to develop the methods to study the business environment and create new services to cope with changing market structures and changing customer preferences (Ruoslahti, 2018).

Furthermore, Williams (2014) found that stakeholders throughout areas such as the environmental impact were poorly reported and that they believed that organizational environment management practices should be included in companies ' annual reports and that they should be examined and audited externally. Barasa, Knoben, Vermeulen, Kimuyu, & Kinyanjui (2017) stressed substantial differences between gold mining business efficiency and other mineral mining businesses. The above research focused on disclosure, efficiency, and reporting in the Eastern African mining sector, highlighting limited reports regarding the consequences of the environmental management and environmental impact on return on equity in the mining industry in Eastern Africa. Other researchers investigated corporate business environment drivers such as safety and comfort according to corporate business environment needs (Abubakar, Elrehail, Alatailat, & Elc, 2017). Control system practices and management are among the driving factors toward enhancing corporate financial performance (De Zubielqui, Jones, & Lester, 2016). The author highlights control system and monitoring influence toward company internal operation that involves quality control assessments while noting errors or deficiencies in the management system. Various systems make firms, enterprises, and other commercial sections more facile to operate, run, and accelerate strategic moves and changes (Tao, Liu, Gao, & Xia, 2016).

Furthermore Lozano (2014) subsequently investigated 12 aspects of working environments, including growth speed, business development, staff development, and working connections. In a similar vein, Qureshi, Rasli, Jusoh, and Kowang (2015) stated that the organization's efficiency and training needs are essential to have company efficiency as a whole. Furthermore, reporting on the company's overall significant social and operational changes is essentially vital to help the company measure, manage, and improve overall efficiency.

More studies are required to establish key determinants of company performance in a changed and competitive business climate. This study may form the basis on which other researchers are interested in measuring firm performance across industries using financial metrics to establish suitable scales for performance measurement (Nitzsche, Wirtz, & Goettel, 2016).

The dimensional design of the model could also help researchers choose appropriate performance indicators for specific research problems, which cover the various aspects of the performance of the companies considered for the analysis. In addition, the model can help bridge the gap between academics and managers.

The research results also encourage mining companies, particularly the firm's executive team and senior managers, to increase their overall participation as organization leaders on all performance issues. Furthermore, the results of this research trigger an evaluation process for decision making among management of the companies, which lead them to continue adopting new technologies and efficient control systems along with innovative management strategies to contribute to the East African Community gold mining industry as a whole and overall firm performance development.

2.2 Firm Performance Concepts and Theories

Various studies show that the net profit has a positive relation to the financial performance of the company. Kodongo, Mokoaleli & Maina (2015) examined the financial impact on firm performance and found a positive correlation between sales growth, debt-equity ratio, asset returns, and the reverse relation between debt-equity ratio and net profit margin, equity return, and earnings per share. The study used the analysis of the correlation and the regression model to analyze the data collected. Since then, the term has been defined in many different ways by scholars. Performance is among the main issues for firms as corporate environment rapidly changing with increased competition and various challenges. Therefore firms use various techniques to measure and monitor their performance and to improve it to be able to sustain their business with healthy financial condition in long term.

Table 2.1 Definition of Firm Performance

Researcher	Definition of Firm Performance
Venkatraman & Ramanujam (1986)	The ability of firm to generate revenue
Combs, Crook & Shook (2005)	Firm income generation process which generates revenue based on accounting returns, stock market, and growth measures
Hoque & James (2000)	Firm performance is the dynamic capacity of firm to generate income-based outcomes based on return on investment
Walker & Caprar (2020)	To perform is to produce valued results based on specific resources of the organization

Firm performance has been studied in various industries, mostly in manufacturing and production in comparison with other industries including mining industry. According to literatures there are more studies regarding operational performance other than financial performance. This emphasize further study into goldmining firm performance with financial metrics. Venkatraman and Ramanujam (1986) mentioned that there were numerous operationalization and multi-dimensionality even within the financial performance and business performance domain. It is, therefore, recommended that researchers should either explicitly test the dimensionality of their conception of business performance or use a priori classification that recognizes the dimensionality issue. Combs et al. (2005) asserted that the last suggestion has not adequately been followed by current researchers. In their attempts to identify the dimensionality of organizational performance, they found that operational performance and financial performance were distinct and that financial performance could be further categorized into accounting returns, stock market, and growth measures. Furthermore, they observed that operational performance had many dimensions and essential to financial performance. Consequently, they advised against using measures that combined both operational and financial performance, such as return on equity and earnings per share as the numerator was derived from financial performance while the denominator was capital structure and related to operational performance. The comparative value of the company's financial measures concerning competition and market value within the same defined industry is another factor to consider to evaluate the results of a company and prejudicial understanding of the company's performance (Haslam et al., 2010).

Current improvements in manufacturing are focused on lean manufacturing, Product design (Tan et al., 2010) to improve operation and firm overall productivity and performance. While performance improvements are showing brand name companies are moving towards sustainable manufacturing and measuring factors behind corporate performance. In various businesses, the focus tends to be on the specific technology rather than from a broader industrial engineering perspective. According to Antony & Bhattacharyya (2010), organizational efficiency with an investment return, a revenue percentage, capability use, and product quality assessments corporate quality actions require specific performance measurement and action plan. The findings revealed a negative correlation between the debt and return on assets (ROA) and return on capital employed (ROCE) ratios and a positive correlation. However, the relationship was insignificant between the debt asset ratio and Earnings per share (EPS). The study also found an insignificant negative correlation between the value and ratio of price books. Financial leverages entail variations in shareholder income due to changes in operational profit resulting from the financing of a corporation's preferred stock or debt assets. However, various theoretical foundations support the use of net profit to finance investments of the company.

Hoque and James (2000) measured organizational performance by evaluating return on investment, the margin on sales, capacity utilization, customer satisfaction, and product quality. The Dynamic capability theory was put forward by (Teece and Pisano, 1994). The theory highlights the importance of dynamic capabilities in the long-term profitability and growth of firms (Teece, 2007). Dynamic capabilities enable firms to profitably organize their resources, abilities, control system, and technologies as well as other assets if the firm is to sustain itself in changing environments (Teece, 2009). The capabilities are crucial in a dynamic environment of rapid change, prevailing in a growing of industries (Teece, 2007; Teece, 2009). Innovation, technological changes, control procedures are acknowledged as the critical firm capabilities that affect a firm's sustained competitive advantage, market share, and superior performance (Albaladejo & Romjin, 2000). The dynamic capability theory focuses on how firms create value for competitiveness in a dynamic environment (Teece et.al, 1997). The dynamic environment influences organizational internal system and procedures to manage, operate and sync with an overall objective of the firm to increase its performance. According to Lawrence and Lorsch (1967) structural contingency theory emphasizes firms in a dynamic, changing industry to those in a stable, established industry and found important structural differences.

Nitzsche, Wirtz & Goettel (2016) picking order theory suggests that most companies search for external financing options rather than equity financing. The trade theory also explains that a balance is established for the optimal debt financing level of companies. This is between the benefits of borrowing and costs, the holding of company assets, and investment plans consistent or constant (Nyamita, 2014). Profitability also referred to as equity trading, is a financial tactic to maximize returns on investment by using additional borrowed funds (fixed cost debt instruments). According to Lassala, Orero & Ribeiro (2021) profitability and growth deals with how entities use debt and equity to finance their assets. Profitability explains the relationship between the owner funds and the borrowed funds forming the capital structures of a company. Profitability can also be defined as using a third-party fund to finance a company that may increase operating profit and taxes.

Profitability is like lending from a financial institution that intends to use the funds more effectively, such as investment, to exceed the costs of interest on the funds borrowed. Company leverages are used to earn higher returns than their cost on fixed charges funds. Investment returns for shareholders can increase through profitability, which generates an advantage in borrowing taxes. As a result, a profitability decision is crucial because firms can use a mix of equity and debt to finance their investments or overall transactions. Profitability is more related to debt used in the capital structure of the company. The net profit is a fixed financial cost of the company. It has a fixed interest payment obligation. With the use of profitability, two different outcomes are possible, either positive or negative. The company is exposed to risk due to high levels of debt that must be refunded at an expense. Companies use profitability to increase investment returns. Excessive use of financial leverages, if not well calculated or managed lead to management issues. The theory of performance suggests that to perform is to produce valued results, and the specific resources and results of organization success and performance are substantially related to the improvement of company growth and its market value are discussed in various studies (Schechner, 2004; Walker, & Caprar, 2020; Aryee, Walumbwa, Seidu, & Otaye, 2016). Market value is defined by value financial value of a firm while profitability is linked to firm ability to generate revenue (Walker, & Caprar, 2020). Furthermore, the upper echelon theory published by Donald, Hambrick and Mason in 1984 suggests that in terms of results and performance, the role of senior management in composition and processes of organizations outcome is critical (Shin, Sung, Choi, & Kim, 2015).

Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. The balanced scorecard (BSC) model examines organization from four major areas to develop an objective measurement for firm performance evaluation and to improve managerial strategies and decision making, which includes financial performance such as profitability, growth and market value, stakeholder which is key stakeholders the organization is designed to serve, internal process as the competence of control system and firm's internal business process and organization capacity which comprise employee's training and growth, organization culture, infrastructure, and technology. It is a tool used for relating, expounding, and applying a vision and a firm's strategy into fixed targets and a clear set of financial and non-financial performance indicators. Financial performance includes firm profitability, market value, and non-financial such as Staff's skill development and employee attitudes. Firm performance field an effort is made in this study, to develop the model for firm performance, based on the stakeholder theory and inspired by dynamic capability theory, resource based-view and structural contingency theory (Freeman, 1984). Stakeholder theory in approach to firm performance includes factors such as profit and growth and market value which are applicable validation for the existence of a business firm and they must be comprised in any determination to measure performance of firms (Selvam, Gayathri, Vasanth, Lingaraja & Marxiaoli, 2016). According to Atkinson et al (1997) stakeholder theory is a multi-dimensional approach for enterprise performance measurement.

As stakeholders are defined as groups or individuals, who have a stake or influence the firm's performance. The stakeholder method to performance dimension focuses on essential purposes for what each stakeholder group expects from the organization, and each group contributes to the success of the organization and its performance. When stakeholder prospects or, even further, contained and clear contracts between the stakeholders and the organization are defined, the organization defines and follows certain strategies to meet its expectancy and fulfill the agreements. Consequently, although the Balanced Scorecard method starts with strategy and then identifies the inter-relationships and purposes for various stakeholders, the stakeholder approach starts with stakeholder objectives and, in a second step, defines a strategy to meet shareholder expectations. In summary, stakeholder theory is mainly toward eloquent a broader firm mission beyond a narrow, short-term shareholder value-maximizing model. It increases firms' sensitivity to failure and fiasco incorporate stakeholder preferences, and prospects would undermine an excessive focus on short-term financial results. While the Balanced Scorecard, however, comprises stakeholder interests endogenously within an intelligible strategy and value-creation outline when outstanding performance with those stakeholders is critical for the success of the firm's strategy, especially to fulfill its financial obligations. Furthermore, various studies found that profitability has a significant positive relation to financial performance while business size has a positive and insignificant relation to firm performance and liquidity. Hereafter, the researchers have brought some related theories of firm performance:

2.2.1 Theory of Market Value of Risky Assets

The differences and risk in firm value and the capital contributed by investors from the balance sheet along with market value are defined by (Simerly & Bass, 2012). Market value is defined as the financial value of a firm within a specific corporate environment. Positive Market Value of Assets (MVA) means additional value in the sector, while negative MVA with lost value is distinguished. It combines business and account rates. MVA can also be seen as incorporating the lack of capacity to assess the future production potential of such activities as traditional accounting metrics of success such as return on assets (ROA). Consider business added value as a critical element of research to tackle these weaknesses in some papers.

The researchers consider a highly optimized capital market model, where it is relatively easy to see how risk premiums implicitly relate to the portfolio decisions of individual investors in current share prices. The key findings support the idea of a better long-term output for more virtuous, even though they have original certification costs, the impact on credibility, the reduction of the long-term costs, and an improvement of the market for socially responsible companies will result in higher sales volumes and income. In addition, several in-depth studies focus on specific variables, such as social capital, beta financial index, and reputation.

Finally, mixed measures like the Market Value assets measure (MVA) or Tobin'q measure have been used in numerous researches. Providing training for employees and specific certifications for quality standards reduces the risk and affects certain performance metrics.

Following above discussions Items in questionnaire for market value include:

My company needs to have a faster growing market and increase in market value of my company has been met during the last fiscal year were adopted from (Basit, & Hassan 2017) which investigate impact of capital structure on firms performance, they investigated cases from Karachi Stock Exchange (KSE) Listed Firms in Pakistan. While construction of modern camps and machines have been implemented during the last fiscal year in my company and my company needs to have a faster growing market adopted from (AbuTawahina, 2015) which explored capital structure and firms financial performance with evidence from middle east.

2.2.2 Firm Growth Theory

Growth in finance is one of the main topics in financial development. Growth significantly influence jobs, business focus, firm financial sustainability, and economic activity. However, the impact, causes, or evolution of firm growth cannot be analyzed by a single theory as the concept is complex as firm growth represent the financial gain based on revenue and profitability for a firm within a specific time frame (Basco, 2013). Firm growth theory can also be identified as the resource-based view and perspective. The resource-based idea focuses on the enterprises' resources including business activities, financial resources, trained and skillful staff align with company objectives, and the firm to use its resources to grow financially. Hence, to determine successive phases of growth and development, resources need to be reconfigured (Gupta et al., 2013). The variables used to measure firm growth determinants in the literature varies. Some theory focuses on an average size, some on internal features, and others on firm control system and technologies implemented in internal operations.

2.2.3 Factors of Firm Growth

The first studies on company growth were mainly based on the impact of size and firm's age. However, the characteristics can affect the company's post-entry behavior toward growing and achieving its objectives (Clarke & O'Connor, 2012). Following Clarke & O'Connor (2012), three classes of growth drivers are often distinguished: i) business-related (also referred to as founders); (ii) company-related (also described as owner/manager specific); and (iii) strategy-related groups. Classical economists have studied the relationship between company size and post-entry efficiency. The variations between the static approach and the dynamic approach are shown in figure 2.1 (Shankar, 2019).

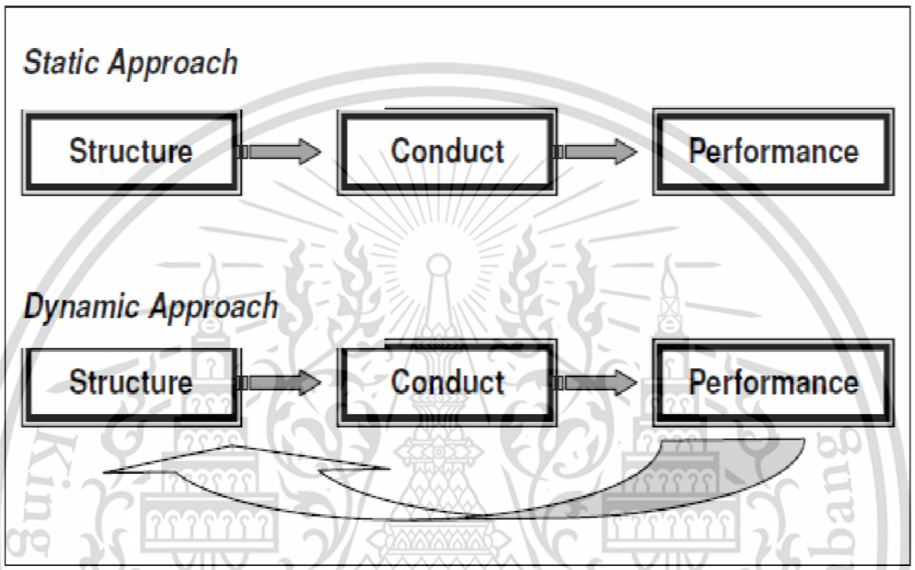

Figure 2.1. Static and Dynamic approaches to the classical model of the firm growth model.

The Static approach is based on microeconomic theory and refers to the system structure, output, and function, in which the parameters are linearly related. Given the market structure, the output and hence the formation of prices of a company can be quantified. The complex approach relies on the feedback from tests to design. It is not the state of the production system that is important to the problem but continuing changes within it. It is no longer a question of making a certain amount to maximize profits. With increased sizes in a complex sense, we can see businesses acting in a way that is considered irrational in the primary microeconomic context. An efficient production system also increases profitability to reconcile this classic model with the growth model suggested by (Rogers, Helmers, & Koch, 2010).

Following above discussions Items in questionnaire for growth include:

My company interested in long-term growth, but have occasional concerns about fluctuation and in my company developed from (Mpanju, 2019) investigated international diversification impact on firm performance, this study focused on firms in The East African Community (EAC) and discovered financial drivers behind firm's success. Growth on net profit earnings from the business over the past five years was satisfactory and my company's growth in turnover/sales from the business over the past five years is significantly positive adopted from (Jelfs, 2019) which studied financial performance in University Spin-Off companies (USOs) in the West Midlands and concluded factors including profitability and growth in companies.

2.2.4 Firm Performance Profitability Theory

After deducting all the expenses, a business produces profits, which are directly related to profit generation, such as the efficiency of a product and other expenses connected with the conduct of the operations of the company. The company aims to increase the existing shareholders' capital. Investor satisfaction is achieved through outstanding financial success and profitability, growth, and interest in the market. These three dimensions are mutually complementary: profitability, growth, and market value. Profitability measures the capacity of a business to produce income (Lassala, Orero-Blat, & Ribeiro-Navarrete2021). The success of the market value relates to the market price. As a company's share, the financial asset increases the company value as well as its market value.

Market value is commonly used to refer to a publicly-traded company's market capitalization. It is calculated by multiplying by the current share price the number of their outstanding shares (Lingaraja et al., 2015). Market value is seen as a possible attribute and reflects the external assessment and aspirations of potential business performance. This is related to companies' historical earnings and development levels and takes future market shifts, perceptions, and competitive changes into consideration. The diversification approach effectively minimizes risks and maximizes returns, growth and profitability (Lingaraja et al., 2015). Therefore, the business value of a company is essential to the ability to predict equity prices based on information released publicly. For both general investors and owners in publicly listed companies, information relating to stock returns is essential. According to firm performance profitability theory, the profit is a return on capital that must be paid to the owners and stake holders of capital as a reward for investing their funds rather than hoarding them; hence, higher firm performance likely results in higher profitability and market value (Von Grebmer, Bernstein de, 2015).

Following above discussions Items in questionnaire for profitability include:

In my company, Improvement in Return on Sales (ROS) from our business is assured and In my company, Improvement in Return on Investment (ROI) from our business is assured were adopted from Kaldybekova (2018) which explored evaluation of the company's financial performance through financial analysis methods to understand factors influencing financial performance. While in my company, Improvement in Return on Assets (ROA) from the business is met according to the estimation adopted from (Nyamita, 2014; Nilsson, 2002) which investigated variables influencing debt financing and its effects on financial performance, other items including Increase in market value of my company has been met during the last fiscal year, Construction of modern camps and machines have been implemented during the last fiscal year in my company and My Company needs to have a faster growing market developed from (Nyamita, 2014) which studied Factors influencing debt financing and its effects on financial performance of state corporations in Kenya.

The stock exchange indexes and other needed stock market information reveal the maximization in stakeholders and investors value through a better success in business operation. Studies on low form efficiency and semi-strong form efficiency show the performance of share prices. The development reveals a company's primary capacity to expand as growth typically occurs in the phase of creation or the process of completion. An increase in size will boost its total production and likely increase income and overall profitability. Larger businesses can also offer size and market value, contributing to greater future productivity for companies. Von Grebmer, Bernstein de (2015) stressed the significant economic growth directly affects the growth of financial markets.

Table 2.2 Concept Synthesis of Firm Performance

References of Literatures Review	Composition		
	Profitability	Growth	Market Value
Basco (2013)	*	*	
Lassala, Orero-Blat, & Ribeiro-Navarrete (2021)	*	*	*
Von Grebmer, Bernstein de (2015)	*		*
Lingaraja et al. (2015)	*	*	*
Lassala, Orero-Blat & Ribeiro-Navarrete (2021)	*	*	
Haslam, Ryan, Kulich, Trojanowski, & Atkins (2010)			*
Clarke & O'Connor (2012)		*	
Walker, & Caprar (2020)	*		*
Total	6	5	5

2.3 Organization Environment Concepts, and Theories

A dynamic organization environment is among the essential factors in creating a safe and comfortable place for employees to work, interact and communicate. Organization Environment's significance and function in determining companies' performance outcomes. In comparison, in some terms, a suitable, dynamic working environment directly enhances the staff leadership aligning with company goals, values, and objectives.

There are several definitions to organization environment as presented in Table 2.3

Table 2.3 Definition of Organization Environment

Researcher	Definition of Organization Environment
Schneider (1975)	Refers to the shared perception of the work environment, including its policies, practices, and procedures
Kwasniewska & Necka (2004)	Recurrent patterns of behaviors, feelings that characterize life based on organization values and norms.
Hitt & Michael (1988)	The way its leaders create organizations norms and culture through creative and dynamic approaches to the working environment
Cote (2017)	A common belief, philosophy, purpose, expectation, hope, conduct, and norms which bind the organization together.

On the other hand, the organizational climate refers to the shared perception of the work environment, including its policies, practices, and procedures (Schneider, 1975). The description of the organizational climate as the observed and recurrent patterns of behaviors and feelings that characterize life based on organization norms and values is offered by (Kwasniewska & Necka, 2004). Individuals from different organizational cultures have different experiences related to creativity. Organizational culture and the way its leaders express it were considered to be key factors for creativity in the workplace by (Hitt & Michael, 1988). The organizational culture is described by Cote (2017) as "a common belief, philosophy, purpose, expectation, hope, conduct, and norms that bind the organization together." They argued that complexity leadership effectively in such contacts in a dynamic environment requires flexibility, dynamism, and organization. Likewise, safety is free from external physical or emotional threats.

Kang, Baek and Lee (2017) stated that various policy tools under non-competitive conditions market types affect the levels of standards and tax incentives for research and development (R&D) to provide tools and strategy toward a better working environment in the organization to promote corporate culture, norms, and values. Competition contributes to more significant incentives, while rivalry contributes to reduce incentives environmental governance, the technological factors in companies to enhance and monitor firm management and information system and strategies promote policies favoring a better working environment (Boxenbaum Jonsson, 2017).

According to Freeman (1984), stakeholders can be defined as groups, individuals, which have some interest in the success of an organization. Stakeholders have control and influence on the organization's system, environment and performance which results in the organization's outcome (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999).

Improvements in conventional energy effectiveness are appropriate with fragile environmental policy support powerful norms involve alternative energy (no coal emissions) (Buttle & Maklan, 2019). Market-based strategies, standardized norms if control policy leads to improvement, which shifts the path of complications and contributes to more sustainable development. The 1960s leading researchers Daniel Katz, Robert Kahn, and James Thomson introduced the organization environment theory and structural contingency (Tinker & Lowe, 1978). The American sociologist James Thomson, his contribution derived from studying social science within the organizations, is responsible for one of the most influential organizations publishing; organization in action which discusses the role of organization environment, its dynamism, and comfort are sets of guidelines and management approaches and their influence on management and employee's interaction and overall organization's culture, norm and value (Todaro, Daddi, Testa, & Iraldo, 2019).

The earliest studies investigating the effects of the environment on organizational structure through the concept of Structural Contingency Theory were carried out by Burns and Stalker, in England in the early '60s. They compared firms in a dynamic, changing industry to those in a stable, established industry and found important structural differences. In the stable industry, successful firms relied on formal rules with decision-making very centralized, and narrow spans of supervisory control. In the more dynamic industry, spans of control were wider, with less formality and less centralization. In other words, they found that an organization's structure was contingent on the kind of environment in which it was operating.

Lawrence and Lorsch (1967) explored different units of an organization face different types of environments, found that each subunit develops a structure matching its environment. A successful organization is differentiated according to its environments and how well integrates and diversified its resources.

According to Hitt & Michael (1988) creativity needs to be explicitly valued, which requires the leader to share continually with all employees a vision that emphasizes its importance. In addition, creative culture must be implemented according to this vision, which requires: the selection of creative people; continual training and opportunities to update knowledge and to develop creative skills; the setting of goals to reach creative products; encouragement, discussion, and sharing of ideas among team members, teams, and all employees; and recognition and reward of creative ideas and products. The dynamic capability theory was put forward by (Teece & Pisano, 1994). This theory explains how firms achieve and sustain competitiveness based on the processes that take place in a firm to match the dynamic, volatile environment. The importance of this theory was necessitated by the shortcoming of the resource-based and action-based theories in addressing dynamic economies. The capabilities are crucial in a dynamic environment of rapid change, prevailing in a growing of industries (Teece, 2007; Teece, 2009). The Dynamic capability paradigm embraces employee's motivation, corporate environment, innovation, organizational learning, and knowledge and change management (Teece, 2010).

Some turn to the organizational theory refers to organization environment comfort and safety, leading to managers' chances of becoming successful in companies, governments, and non-profit organizations. A critical element of this approach is organization theory, which sets out the basis for management activities in several key business areas. However, the theory of organization is not a standardized science based on generally accepted principles as various organization theories focus on different areas of the organization (Thompson & Bates 1957).

Environment dynamism refers to a dynamic environment which flexibility exist to motivate employees while environmental safety refers to a safe working environment which employees and management can interact effectively and environment comfort, refers to physical and emotional comfort of a working environment which is based on creativity, using advance technologies and innovation within the working environment that significantly influence employee's performance (Yafi, Tehseen & Haider, 2021). A coordination system manages action between individuals in the company who differ in their dimensions of interests, preferences, and information is based on theory of organization toward organizational practices and service practices perspective (Yafi, Tehseen, & Haider 2021). According to Hatch (2018) organization theory is "a set of academic approaches that attempt to explain the diversity of organizational structures and operational processes." This means that organizational theories are systems of knowledge that study and explain organizational structures, functions, functions, and group behavior and behavior of individuals (Jia, Guo & Barnes 2017).

2.3.1 Kolcaba's Comfort Theory

The Kolcaba's Comfort Theory (CT) (Jørgensen, & Messner, 2010) analyze and measure the norm and philosophy of treatment and values within the organization. Dr Kolcaba invited staff members, nurse leaders, and the CNO to New England, to hold a two-day immersive conference. The emphasis on caregivers' comfort, implementation of the concept that is not common to staff, and patient and family satisfaction were challenged by Kolcaba. Instead of the safety of patients and families, nurses as carers often ignore their comforts. Yohannes (2015), believed that health care providers ' comfort is an essential moral factor and ultimately affects recruitment and retention. The Comfort Theory was originally developed as a theory for patients/families. The initial analysis by Kolcaba of the comfort concept showed that comfort is central to diagnosis. She identified 3 types of comfort: a) relief, the state of having specific comfort needs to be met; b) easiness, the state of relaxation or happiness; and c) transcendence, the state of resolving difficulties or pain.

Furthermore, it noted that discomfort is more than an adverse feeling and emotional anguish. Therefore, the Comfort factor corresponded with clinical values and areas such as treatment, symptom management, commitment, holism, rehabilitation, needs, and homeostasis. The human experience is also performed in four contexts: physical, psycho-spiritual, sociocultural, and environmental. The individual's physical comfort is defined as all physiological and homeostatic aspects, and the inner consciousness of self is defined as psycho-spiritual comfort, including love, identification, sexuality, sense of life, and an appreciation of the relationship with a higher being. Overall, Comfortable theory suggests engaging more frequently in health-seeking activities involving internal patterns and external behaviors to create a comfortable and safe environment with patients and their families (Rustam, 2017).

Also, Darabont, Antonov, and Bejinariu (2017) reviewed elements relating to the workplace through kolcaba's comfort approach. They defined organization comfort based on employee's physical and emotional comfort within the organization provided through creativity, advance technologies and innovative means and dynamism as sets of change management guidelines, advance equipment and machinery accuracy as well as implementing technologies toward effective interaction between employees and management within a dynamic template in a corporate environment which provide motivation, knowledge sharing and efficiency and offer organization safety based on the right framework for a healthy environment for employees toward promoting firm norms and values. Darabont et al. (2017) also stated that organization comfort is referred to the level of physical and emotional comfort employees have in a corporate environment through technological changes, innovation and level of creativity within the organization while safety refers to employees health concern, safety management and standard such as logistic safety and physical and emotional safety from toxic environment and organization dynamism refers to change management guideline and practices, technological advancement based on company's norms and values which influence employees motivation, knowledge sharing and interaction with one another and therefore overall achieving the organization's goal. Islam and Tariq (2018) argued that an organization's ability to share knowledge across the system depends on the organization dynamism as a set of dynamic approaches organization take to connect, create and promote factors including innovation and creativity to motivate employees and working environment which led to organization efficiency. In a well-facilitated work environment, employees in general tend to be more productive.

Moreover, the quality of comfort in the working environment determines the employees ' satisfaction levels and productivity. The productivity of workers cannot be optimal unless the working environment is not favorable. A dynamic organization environment improves the productivity of employees (Islam and Tariq 2018). Their study showed that the working environment of the organization had an impact on the participants. Their study also revealed that the organization needs to improve its physical environment so that employees can stay in the office, work comfortably, and do their job. It also showed that employees are sometimes not recognized as individuals, i.e., there is no sense between them and the organization, and that this sometimes demoralizes them because they cannot express their views.

Following above discussions, items in questionnaire for environmental comfort include:

My employer's work environment must be positive in a direction so that they can add more creativity at work Overall, I find my work environment comfortable for the personnel due to using the advanced technology were adopted from Orth (2015) which studied organizational change in The United States Forest Service:, the study focused on the role of community collaboration and variables influencing it. My organization has a safe work environment due to applying innovative means and I believe that my organization needs an Intensity of environmental changes to upgrade our technical control process adopted from (Schaltegger & Wagner, 2017; Orth, 2015) which studied organizational change as well as performance indicator for social, environmental factors.

2.3.2 Structural Contingency Theory of Organization

According to Donaldson (2001) on structural contingency theory he argues that organization contingency is depend on structural fitting within an organization which include items such as safety, diversification, comfort, dynamic environment, and size and task uncertainty. If the structure fit well toward contingencies then it results in higher performance in comparison to if structure doesn't fit well then it results in low performance. The contingency factor include task, size, diversification and structural variables. The fitting structure is more bureaucratic if size increases, such as number of departments and hierarchical levels of formalization and low level of centralization. In organizations or department that fitting structure has less formalization and high centralization then task uncertainty increases. It also effect coordination and functions between various departments. Diversification can increase if the fitting structure has more divisions which led to greater degree of administrative structures. If diversification increases then more autonomous division and smaller central office. In summary greater degree of diversification increase the bureaucracies and task uncertainty increase its discrepancy.

According to Galbraith (1973) the concept of uncertainty include knowledge management to preserve information in an organization and the extent of information required to perform certain task. Contingency theory envisage and construct the relationship between organization and its characters which include organization dynamism, capabilities and orientation (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). Firm performance depends on certain contingencies and circumstances (Hayes, 1977; Otley, 1980). Other external factors such as capabilities and control system are influenced by contingency approaches in organizations (Lind & Kraus, 2010). Several studies cover structural contingency approaches in organization which include strategic positioning and dynamism (Ittner et al., 2003), environmental safety and uncertainty perception (Govindaraján, 1988; Hoque, 2004) inclusive diversification in an organization (Hall 2008; Chenhall, 2005) access and influence in human resource and employees (Chandler and Hanks, 1994) employees proficiency capital background (Naranjo-Gil & Hartmann 2007a, 2007b).

2.3.3 Environmental Dynamism

A more dynamic and comprehensive view of change management is proposed as a way forward to help understand changes and to manage the process more effectively. Integrating complexity and system theories can better understand the disruptive and smooth processes of organizational change is possible through management guideline and practices to motivate employees, innovation and application which lead to change management in a dynamic environment (Pathak, Day, Nair, Sawaya & Kristal, 2007). The system theory views an organization as a complex series of elements that are dynamically intertwined and connected, including its inputs, processes, outputs, and feedback loops, as well as its environment in which the system operates and continually interacts. Organizations are not static but are in dynamic equilibrium, constantly changing. They are adaptive systems integral to their environment.

Following above discussions Items in questionnaire environmental dynamism include:

My company business unit consistently change its practices to keep up with cutting edge innovations. In my company, the machinery accuracy degree is high and my company follows the local technological dynamism rather than international technological standards were adopted from (Vasco, 2011) which explored successful organizations From the theoretical research to the business point of view and concluded factors which influence organizational environment including innovation and comfort within the organization environment. While my company follows to setup a dynamic environment through innovation and technologies developed from (Hueske etl., 2015) which investigated the innovating organization, and its individuals. Researchers developed multilevel model for identifying innovation barriers accounting for social uncertainties.

2.3.4 Occupational Safety Theory

Workplace health is a controversial issue for industries that act as a significant factor in creating a healthy working environment in an organization. Moreover Moghadam & Jafari (2015) the Germany-based philosopher, stressed the importance of health and safety in organization environment: health isn't just all, but all is nothing without health. "Different interpretations of the literature are gathered here for further clarification on the essence of occupational safety, health, and the environment." According to various studies, efficient workplace protection and health management play a key role in running a successful business. Many studies have also shown that levels of productivity and the health of workers are closely linked. The Joint Committee on Employment and Health would support and safeguard the highest level, physical, mental and social wellbeing of the workers and the employees in all occupations, in the light of the International Labor and World Health Organization (ILO-WHO) mentioned safety perspectives in the global strategy, employment health involves occupational health, occupational hygiene, job, physiotherapy, ergonomics, and recovery.

Following above discussions Items in questionnaire for environmental safety include:

Safety management at my company is a priority and having an Environmental Management System is necessary for my mining company and my logistics safety is compliant with internationally recognized systems such as ISO 14001 or EMAS were adopted from (Bushiri, 2014) which explored the impact of working environment on employees' performance from a case of institute of finance management in dar es salaam region in Brunei. My company has an environmental action plan outlining key actions and targets for the current year adopted from (Nolan, & Morley, 2014) which investigated the relationship between individuals and environment fit and cross-cultural adjustment among self-initiated expatriates.

Moreover, safety at work refers to the likelihood of risk to persons, equipment, facilities, and enterprises are low and to an acceptable degree. Furthermore, the International Labor Organization (ILO) considers health in the working as related to workplace life, including the safety and quality of the physical environment, worker sentiment, and work satisfaction. This concept ensures that the employee's well-being is stable. In addition, environmental safety is defined as promoting the health of workers and host communities, providing a safe work environment through safety management system and standard in which employees can work without injury, efficiently using resources, pollution prevention, and improved protection of biodiversity (Glinskiy, Serga & Khvan 2015). It also covers ethical approaches to business, economic development, and basic human rights, is also considered by the community (Glinskiy, Serga & Khvan 2015). It stated that occupational safety and health aim to protect human resources and facilities and recognize, assess, control, and eliminate hazards to prevent severe injuries and damages in the working environment. They also thought that besides moral problems, safety and health at work must include economic issues. It may be substantially more expensive to maintain a safe and healthy workplace for accidents. It described the protection and safety of workers, organizations, and everyone affected by the business as a management discipline concerned with employees' security, health, and social security (Nichols Walters & Tasiran 2007). In addition, the organization has integrated safeguards. Besides prescribing acceptable forms of behavior to those who choose to submit to it, it can also offset the effects of human activity, which transcends its conventional ways.

Table 2.4 Concept Synthesis of Organization Environment

	Composition		
References of Literatures Review	Environmental Comfort	Environmental Dynamism	Environmental Safety
Yafi, Tehseen, & Haider (2021)	*	*	*
Pathak, Day, Nair, Sawaya, & Kristal (2007)		*	
Glinskiy, Serga & Khvan (2015)			*
Moghadam & Jafari (2015)	*		*
Islam and Tariq (2018)		*	
Todaro, Daddi, Testa, & Iraldo (2019)	*	*	
Darabont, Antonov, and Bejinariu (2017)	*	*	*
Pathak, Day, Nair, Sawaya, & Kristal (2007)		*	
Darabont et al. (2017)	*	*	*
Total	5	7	5

2.4 Social Factor Concepts and Theories

Social Factor has been defined by many researchers, as shown in table 2.5.

Table 2.5 Definition of Social Factor

Researcher	Definition of Social Factor
Betcherman (1992)	Attitude of employees and managers based in type of activities which is planned, systematic and it results in enhanced level of skill, knowledge, and competency that are necessary to perform work effectively
Abiodun (1999)	Social Factor refers to a systematic development of the knowledge, skills, and attitudes required by employees to perform adequately a given task or job.
Wagner (1994)	A process whereby influence, value is shared among individuals who are otherwise unequal in terms of hierarchy
Knoop (1991)	The act of interaction and understanding toward shared values on companies, values and norms to achieve organizational objectives

When exploring employee involvement which includes employee interaction toward each other previous scholars define it as the act of sharing decision making with others to achieve organizational objectives based on its values and norms (Knoop, 1991). Participation can offer employees various levels of influence in the decision-making process, ranging from formally established consultative committees to developing good relations with managers or supervisors through a process whereby influence is shared values among individuals who are otherwise unequal in terms of hierarchy (Wagner, 1994). Social risk factor involves identifying how training need and employee proficiency affect their performance in dealing with company's goal and values which are defined as the internal environment of external risk factors and risk factors (de Moura Maciel, Pardini, & Monteiro, 2018).

According to the theory of social facilitation, the presence of other people has positive implications for each person's performance in a simple task, but negatively, for a complicated or new task (Motella, Pini & Presti, 2012). various studies explained the effects of social facilitation with the drive factors, enhanced drive in the presence of another person, enhances simple task performance, anxiety and assessment probability, not just the presence of the people, drives them, it also builds a relation work environment as a whole, and cognitive factor improve performance to a certain degree to create a systematic development of the knowledge, skills, and attitudes required by employees to perform adequately a given task or job (Abiodun, 1999). The attitude of employees and managers are based on the type of activities which is systematically planned and it results by enhanced level of skill, knowledge, and competency that are necessary to perform work effectively (Betcherman, 1992). According to Chiniara, & Bentein (2018) operator proficiency which include standard procedures such as line proficiency check, type rating examiner and training need include aligning resources to meet technological business advancement as well as understanding national values along company financial value and non-financial values and social attitude consist of employees' encouragement toward using and applying advance technologies. According to Hitt & Michael (1988) creative culture must be implemented according to this vision, which requires: the selection of creative people; continual training and opportunities to update knowledge and to develop creative skills; the setting of goals to reach creative products; encouragement, discussion and sharing of ideas among team members, teams, and all employees; and recognition and reward of creative ideas and products. Operator proficiency is having certain standard procedures which include type rating examiner, line proficiency check while training need include encouraging and understanding how to use and apply innovative means and technologies to solve problems among colleagues and employees in an organization (Obrad & Gherhes, 2018).

Following above discussions, items in questionnaire for operator proficiency include:

Having Line proficiency checks (LPCs) which are carried out by Line Training Captains (suitably qualified commanders) can help the company significantly and I believe that an Operator Proficiency Check must be conducted by a Type Rating Examiner (TRE) to respect the technological standards were adopted from (Engetou, 2017) which investigated the impact of training and development on employees proficiencies and organizational performance .While Each mining operator must undergo an “operator proficiency check” every once a while to demonstrate his or her competence in carrying out normal, abnormal and emergency procedures developed from (Bevan, 2012) which investigated factors influencing employees high performance and productivity. According to Ruoslahti (2018) social technology refers to innovative activities and facilities to address social requirements to achieve a company’s objectives and operator proficiency is defined as type rating examiner and operator to check and monitor operator proficiency. Ruoslahti (2018) also defines training need as set of training for employees to use technological advancement and application effectively within the organization. It is also suggested that employees' development through training in information technology leads to improving the departments and therefore organization as a whole (Foxon, 2014).

Specific methods can occasionally contribute to personal developments, while innovation can sometimes contribute to social technologies being implemented, as (Abdul Basit & Medase, 2019) proposed. According to as Abdul Basit & Medase (2019) employees’ access to technologies along with the necessary training, significantly improves their communication, operation control system. They also define training need as aligning available resources to meet technological business advancement while also define social attitude as encouraging employees to apply technological advancement and management software to enhance department performance. Saleem (2015), Arinanye (2015).

Following above discussions, items in questionnaire for social attitudes include:

My colleagues are effective in encouraging the management team toward applying technical advanced software and my colleagues are helpful when I need them to figure out the situation regarding an innovative issue in the company and I try to be interested in what my colleagues share with me as a solution, strategy, or technological approach were adopted from (Colorosa, 2016) which investigated performance management techniques, including the relationship factors between managers and employees. While I believe the employees are being supportive in solving technical issues in the control system process developed from (Zhang, Lee, & Wong, 2016) which explored the relations between leadership, management styles and job satisfaction.

Stakeholder theory has attracted considerable attention from politicians and managers. According to Freeman (1984) stakeholders, company objectives based on management-specific proposed strategies need to fulfill stakeholder interest. To fulfill stakeholders' interests, employees' proficiency and training need toward using and implementing new technologies, knowledge management. To understand the concept of stakeholders, it is essential to understand what it stands for which is "an interest or share in an undertaking" (Carroll and Buchholtz, 2011).

Ruoslahti (2018) mentioned that social innovation is often more important in affecting patterns or prioritizing opportunities that lead to technological innovation. As social innovation in literature is a quite new term, no consensus on operationalization and the assessments of the social innovation structure has yet been reached. However, it is used to understand and create a continuous social change in a broad context (Tigabu, Berkhout, & van Beukering, 2015).

Johnson, Gardell & Johannson (2020) then discussed the importance of social computing, integrating three components. Johnson, Gardell & Johannson (2020) also defined social attitude as interaction employees have toward each other which is influenced technological application and software. They also argue employees can interact more effectively to sustain an efficient control system through innovation, creativity and advance technologies. Ruoslahti (2018) mentioned various essential elements for distributing technology, offering innovation, communication channels, time, and the social system. However, to evaluate the relations between the stream of data and knowledge, as well as the effect of the relationship between science and technology, it is important to understand how the socio-institutional aspects of data and knowledge construct are depicted.

Patent metric techniques evaluate the characteristics and use of patent documents as an instrument and promote the identification and emotional and social relationships of information within the continuous integration system. This approach is consistent with calls for innovation to be co-created with companies to expand their partnership in various levels to benefit and maximize their potentials.

2.4.1 National Innovation System Theory

Training needs to be provided when employees lack the skills or information to work productively and the right resources exist to draw up, impart the training. It is important to provide off-the-job training when the vast majority of staff have a similar training requirement and adequate skills and resources (Hajli, 2014). When the criteria above are complied with, and once it is possible to minimize work distractions, the activities at work will not represent a threat to health, safety, or productivity and provide benefits to employees and the organization as necessary training is obtained.

It is necessary to identify the mission and objectives related to performance, and therefore to establish these linkages, professional training is required. To determine the knowledge, skills, and attitudes needed to perform these functions effectively, the organization must have clear goals and objectives. This involves defining and prioritizing the organization's mission and the training unit's mission and operator proficiency.

Following above discussions, items in questionnaire for training needs include:

In my company, we consider aligning resources to meet the technological business advances and control process of the Company and In my company, it matters the most to understand the costs, profits, markets, and added value of the department and how those contribute to the success of Company and In my company, it's important to look at the "big picture" of Company's goals, rather than the individual department's needs were adopted from (Arinanye, 2015) which investigated organizational factors such as training, comfort, relationships among employees, management styles affecting employee performance. In my opinion, it matters to anticipate global trends in the light of endorsing company's norms and values developed from (Saleem, 2015) which studied the impact of leadership styles on job satisfaction and mediating role of perceived organizational.

Identifying the mission tasks needs to accomplish comprehensive performance objectives which require training needs for employees including understanding value of company such as cost and profit along with company's norms and value as well as global trend along with national values which enhance by value added technologies and determining the required functions, identifying knowledge and skill gaps, identifying execution procedures and problems, and finally drawing up an action plan that prioritizes activities (Bartley, 2016). Therefore, a direct linkage between the organization's mission and its learning culture benefits both the organizations and individuals by highlighting the positive associations of social attitudes, development, operator proficiency, and organizational performance. The development of operator proficiency in observational learning is grounded in social reciprocation. This requires certain procedure standard such as line proficiency check and type rating examiner to sustain quality standard (Lu, Fan, & Zhou, 2016).

Also, Human expectations, beliefs, emotional bents, and cognitive competencies are developed and modified by social attitudes influences that convey information and activate emotional reactions through modeling, instruction, and social persuasion (Bartley, 2016). According to (Zhang, Lee & Wong, 2016) social attitude in organization refers to how employees use and apply technologies and innovation to communicate effectively and solve problem. Employees also evoke different responses from their social attitudes by their physical characteristics, such as their age, size, race, sex, and physical attractiveness.

2.4.2 Theory of Reasoned Action (TRA)

The theory of reasoned action (TRA) clearly states that individual attitudes is influenced by their intentions. Those intentions are in turn shaped by each attitude toward behavior. TRA advocates that the decision-making process for individuals involves attitudes, intentions, and behaviors. The theoretical basis of TRA for organization is that employees and managers act on their opinions over the phases of attitude. Attitudes can be affirmative and negative feelings that customers get towards a specific technology (Schierz et al., 2010). Based on Allport's theory (1935) attitude is an intelligent and unbiased state of evaluation that is built on the consumer's knowledge of technology which affects the individual's reactions as consumers adopt new technology. As consumers adopts a certain behavior, then trust can be gained through adapting that particular behavior which is called consumer attitude (Ajzen & Fishbein, 1980). TRA also stated the employees' behavior is mainly motivated by their attitude. According to Yeo et al. (2017) and Amoroso et al. (2018) there is a significant relation between organization environment through mediating role of operator proficiency and attitude supported by TRA toward adopting a new technology to influence firm performance. The decision toward using certain technology is based on its usefulness and operator proficiency on how to use it (Davis et al., 1989). Therefore technological advancement require skilled employees as technology usefulness is associated with employees social aspects which include operator proficiency, training need and attitude (Gokilavani et al., 2018). Several studies show significant relation between employee's social factor of attitude and training need toward using technologies supported by TRA in mobile payment systems to improve firm performance in e-commerce (Shaw, 2014). It is proven that payment through mobile banking is more convenient and reliable than traditional banking systems (Blockchains, 2018). Theory of reasoned action enhance behavioral intention on how to use technology which in influenced by perceived ease of use on control system devices to manage and sync firm operational loops (Lee et al., 2017; Agrebi & Jallais, 2015; Davis et al., 1989). According to Indarsin and Ali (2017) and Raza et al. (2017) employees social aspect and attitude play an important mediating role supported by theory of reasoned action in perceived ease of use and perceived usefulness and behavioral intentions between organization environment and to adopt new technologies and control system and to influence performance.

2.4.3 Theory of Social Learning

Social learning theory suggests that social behavior is learned by observing and interacting the behavior of others. Social learning theory supports the concept that training effectiveness improves employees' proficiency and technical needs on how to use technologies and as well as understanding firm's norms and values. Social learning theory signify the importance of perceived proficiency in defining behavior (Bandura, 2006). The decision to participate and persist in a behavior is mediated by both proficiency prospects and outcome expectations linked with the attitude (Bandura, 2006).Organization environment is mediated by employee's social factor which include attitude and training need toward adopting new technologies and know how to use it (Fidishun 2000). According to Lieb (1991) social learning theory support mediation of employee social factor and attitude through effective training to gain problem solving skills and create sustainable relationship among employees and manager to effectively learn and skills necessary to use and adopt new technologies to improve organization performance. Human Resource Executive should ensure that training is provided to the senior employees in manners toward self-directed and responsible learning. Also, it should promote the learners' motivation to obtain new knowledge and information. Senior employees should be encouraged to apply their knowledge and skills adapted from their experiences to their new training approaches (Fidishun 2000). According to Knowles (1980) discovered that forming a training need enhance the purpose of offering solution to a certain problem in the firm that can inspire the senior employees in the firm to learn because they are goal-oriented (Fidishun 2000). According to Niebel

(2018), quite a number of studies have examined relationships between organization environment through mediation of social factor such as employee attitude, proficiency and training need effects supported by social learning theory toward firm control system and performance and the majority of studies have shown a positive relationship between them (Al-Maroof & Al-Emran, 2018). Ashrafi et al. (2014) argue that lack of Information Technology skills is one of the biggest reasons why most small and medium size enterprises are not adopting technological innovation which emphasize the importance of effective training for employees further on know how to use new technologies adopted by the firm (Laihad,2013; Sondakh, 2017). According to Kim et al. (2009) an attitude affects employee behavior by filtering information and shaping their assumption of the world and the organization. Employees with weak attitude toward supporting new technologies can change their attitude through training to be able to use technologies. That attitudes showed a significant influence on technological implementation (Weng et al., 2018; Indarsin &Ali, 2017). Understanding how employee social factor acts as mediator enhanced by theory of social learning in the relationship between organization environment need and technological innovation to control system and firm performance, provides guidelines for management practices in seeking to improve firm performance (Al-Maroof & Al-Emran, 2018).

2.4.4 Contingency Theory of Leadership

The contingency theory of leadership was proposed by Fred Edward Fiedler in his landmark 1964 article, A Contingency Model of Leadership Effectiveness. Contingency approaches has various implication on management. Contingency theories suggest that good management have different based on different situations. Researches on contingency theory emphasize that the role of senior management in leadership in organization structure and decision making are significant to estimate the outcome of good managerial outcome to influence firm performance (Shepard and Hougland, 1978). Contingency theory of leadership vary in their degree of orientation, roles and abilities to lead successfully. Fiedler's contingency theory suggest that leaders orientation and abilities play important roles in managing employees and management relationship, training need and play mediating role between organization environment, technological adoption and control system as this increases employee's flexibility by permitting them to recognize and adopt new ways to add value to the firm (Markham & Markham, 1998). According to Manz and Sims (2001) leaders should empower employees and promote self-leadership under certain circumstances. Theory of leadership support interaction between executives and employees despite different degrees of orientation to promote employees influence themselves and each other to achieve the self-direction and self- motivation necessary to perform (Manz, 1986; Manz & Neck, 2004; Manz & Sims, 2001). Several researchers has greatly enhanced knowledge through theory of leadership concerning the link between organization environment and mediating factor of social factor which include elements as employees and management proficiency, training need and employees attitude toward technological innovation and control system to enhance firm performance (Kanfer, 1970; Carver & Scheier, 1981; Cautela, 1969; Mahoney & Arnkoff, 1978, 1979; Thoresen & Mahoney, 1974), self-management (Andrasik & Heimberg, 1982; Luthans & Davis, 1979; Manz & Sims, 1986), intrinsic leadership theory (e.g., Deci and Ryan, 1985; Bandura, 1986), and leadership and social attitudes (e.g., Beck, Rush, Shaw, & Emery, 1979; Burns, 1980, Ellis, 1977; Seligman, 1991).

Building on these theoretical foundations, self-leadership prescribes specific sets of behavioral and cognitive strategies aimed at positively affecting individual performance outcomes. Contingency theory of Leadership concept characterized three factors which include leader-employees relations, to deal with organization environment, emotions such as trust, safety and confidence and task structure, is related to defining task completion and success and position power, deal with the orientation and degree of influence among senior managers in relation to decision making and employees also suggest that the instruction and transactional leadership styles influence in behavioral compliance and the transformational and empowering leadership styles outcome influence affective commitment and loyalty (e.g., Bennis & Nannus, 1985; Conger, 1999; Manz & Sims, 1991, 2001; Sims & Manz, 1996).

Table 2.6 Concept Synthesis of Social Factor

References of Literatures Review	Composition		
	Operator proficiency	Training needs	Social attitudes
Chiniara, & Bentein (2018)	*	*	*
Obrad & Gherhes (2018)	*	*	
Bartley (2016)		*	*
Lu, Fan, & Zhou (2016)	*		

Table 2.6 Concept Synthesis of Social Factor **(Continue)**

References of Literatures Review	Composition		
	Operator proficiency	Training needs	Social attitudes
Zhang, Lee & Wong (2016)			*
Ruoslahti (2018)	*	*	
Johnson, Gardell & Johannson (2020)			*
Abdul, Basit & Medase (2019)	*	*	*
Total	5	5	5

2.5 Technological Innovation Concepts and Theories

Min, Ling, & Tan (2016) utilize a critical issue for industrialization and governments everywhere: encourage innovation and change among industry leaders to increase productivity and enhance the industry's competitive position. To achieve this objective, all those involved in making decisions that affect productivity improvement and industry development must understand the complex processes and technological changes within organization and between organizations and individuals involved in the context of the innovation system.

Technological Innovation has been defined in many different ways, as shown in Table 2.7

Table 2.7 Definition of Technological Innovation

Researcher	Definition
Schumpeter (1939)	Technological innovations comprise new or significantly modified technical products, processes, and procedures where firm performance characteristic emerges from a technological novelty

Table 2.7 Definition of Technological Innovation (Continue)

Urabe (1988)	The implementation process of new technology adoption to increase efficiency
Coccia (2017)	Software amendment to increase company's productivity
Tworek (2019)	Ability to increase competitive advantage through information technology and innovation process

According to various studies, the success of today's businesses increasingly depends on their intellectual assets as opposed to their tangible resources. Technological innovations comprise new or significantly modified technical products, processes, and procedures where firm performance characteristic emerges from technological novelty (Schumpeter, 1939). According to Uraba (1988) implementation process of new technological adoption is essential for organizations to increase efficiency. According to the theoretical framework of Min, Ling & Tan (2016) a perception of expense amongst consumers of innovative products are a much more significant factor than attitudes towards reliability or quality, and firm performance is rather depending on innovative software to provide with solutions on major obstacles to the commercial exploitation of innovative products (Coccia, 2017). Efficiency can often be expressed as a percentage of what can ideally be expected. New products and processes and important technological software changes in products and procedures comprise technological innovations (Brem & Voigt, 2010). Following up on the Lawrence and Lorsch (1967) on structural contingency theory, observing that different units of an organization face different types of environments, found that each subunit develops a structure matching its environment which led to enhancing technological adoption and procedures.

Bryson (1995) argued that, in stakeholder theory, organization objective plays an important role in stakeholders' diversity of interest. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. The balanced scorecard model suggests dynamic environment support valued-added strategies and measurement greatly influence organization value outcome through technological changes and innovation toward firm performance. In a dynamic environment, stakeholders have power and influence over the kinds of technologies firms adopt to increase organization performance as stakeholders are affected by the firm's outcome in terms of growth and profitability (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999). Aga Noorderhaven, & Vallejo (2016) analyzed how science, technology, and social studies are institutionalized and the relation between innovation and social context in organizations' development. Jia, Guo & Barnes (2017) studied extending the information system continuance model based on the technology and organization environment framework and their interaction to influence the enterprise's culture and the employee's attitude. Ruoslahti (2018) examines innovation procedures within social contexts, the power of creativity, and innovation from the public and private sector and individuals toward influencing innovation and information technology systems. These instances show how emergency and disaster management technologies can also be created under social situations, using common 'open innovation' frameworks in the private and public sectors.

Wadhwa, McCormick & Musteen (2017) claim that technological expertise in the consumer electronics sector, creative resources fostered by popular cartoons and animation have enabled a prosperous video game industry in Japan. The knowledge and creative foundations affecting this industries' evolutionary path, with the connections to consumer electronics and the cartoons and animation sector, then be evaluated along with the industry's growth from its origins to platform developers and software publishers.

2.5.1 Dynamic Capability Theory and Technological Innovation

Teece and Pisano in 1994 developed dynamic capability theory. This theory explains how firms achieve and sustain competitiveness based on the processes that take place in a firm to match the dynamic, volatile environment. The approach emphasizes the capacity of a firm to renew competence as well as to integrate and reconfigure resources to match and create changes in the organization through innovation and technological adoption (Teece & Pisano, 1997; Eisenhardt &Martin, 2000). This theory highlight the importance of firm's dynamic capabilities that are crucial in achieving competitiveness in a dynamic volatile environment which through mediating role of technological innovation influence firm performance (Barney, 1986). Dynamic capabilities consist of resource-based view which include social aspect and employee's proficiency, organization dynamic environment and comfort, organization values and norms, organizational superior performance. Dynamic capabilities assumption use firm assets and resources to be implemented toward value added strategies to create capabilities through mediation of technological advancement and control loops to increase firm performance (Barney, 1986; Wernerfelt, 1995). Dynamic capabilities create competitive advantage in a firm such as using firm resources for value creation strategies and competences (e.g., configurations, Collis and Montgomery, 1995, 1998; Porter, 1996; core competencies, Prahalad and Hamel, 1990; lean production, Womack, Jones, and Roos, 1991).

Dynamic capabilities are at the core of organizations and their strategies which driven from managers and their resource based perspective, including technological implementation which sync with organization system in order to generate value added strategies (Grant, 1996; Pisano, 1994). The main driver behind firm value creation and combination of other resources into new source for competitive advantage (Henderson and Cockburn, 1994; Teece et al., 1997). As Teece and colleagues (1997) defined dynamic capabilities as the process of firm resource usage to specifically integrate, process and reconfigure resources to match and create market value, changes and to increase profitability for the organization. Other researchers such as Henderson and Cockburn (1994) adopt the term architectural competence while Amit and Schoemaker (1993) used 'capabilities.' Based on dynamic capability theory, technological innovation mean to reduce risk and increase competitiveness for the firm (Burns and Stalker, 1994; Liker et al., 1999). Entrepreneur innovativeness is the process of seeking new opportunities and technological adaptation and products and the removal of outdated processes ahead of competitors to increase firm dynamic capabilities and performance (Wambugu & Gichira, 2015). It includes the manager's ICT skills and knowledge needed to generate new ideas that will promote business growth (Wamuyu, 2015). Entrepreneur innovativeness includes the manager's capacity and to identify and seize opportunities for endorsing the technological innovation mediation between staff using technologies and control system to utilize of resources and improve firm dynamic capabilities and performance (Yunis et al., 2018). Kuratko (2017) defines entrepreneur innovativeness as a vision-directed procedure whereby an entrepreneur emphases on revitalizing and determining the organization's scope of processes through the technological innovation mediation (Hung & Chiang, 2010). These initiatives improve firm performance and competitive advantage through technological innovation and procedures (Shaw et al., 2005). Technological innovations can contribute positively to organizational performance once the staff proficiency enhance technological usage and procedures to influence control system and performance by entrepreneurial strategies, actions, and behaviors (Guo & Miller, 2010; Kyla, Puumalainen, & Saarenketo, 2005).

Chiu, Chen and Chen (2017) argue that dynamic capability is among the most significant factors that influence the adoption of information and communication technology in Malaysia. The manager of small and medium enterprise is likely to implement information technology if it is beneficial for the firm (Maduku et al. 2016). New technologies offer a unique dynamic capability to enhance firm technological innovation as a mediation between organization, employees and firm performance (Borgman et al. 2013). According to Ghobakhloo and Hong Tang (2013), implementation of IT are influenced by firm dynamic capability and has found that compatibility is an influential factor (Chiu et al. 2017). Innovations that are compound to use are more likely to be adopted slowly, whilst innovations that are easy to master are adopted faster. The intricacy of technological innovation could be an essential variable in implementing technological innovation believe that compound IT could be risky to adopt, and they are more likely to be abandoned (Abualrob & Kang 2016). Abualrob and Kang (2016) found that density is an important factor that effects the implementation of new technology. Understanding how technological innovation has a mediation role in the relationship between employees social aspect, training needs and organization environment to control system and firm performance, provides guidelines for management practices in seeking to improve firm performance and supported by theory of dynamic capability (Angeles 2014; Rogers 1995; Tornatzky et al. 1990; Djatikusumo ,2014; Ghobakhloo & Hong Tang 2013; Maduku et al. 2016).

2.5.2 Technological Innovation, Efficiency Theory

The idea of technological innovation and productivity was researched by Chinese scholars (Wu, Zhuo, 2017). The researchers mentioned that the effects of technological innovation are a sort of productive performance that, based on the research results of the above scholars, is substantially focused on technical efficiency. This is the relation between the minimum cost of a given commodity or the actual output level and the maximum productivity possible at the same supply, input, and market price. Researchers took various approaches and carried out in-depth research in developing different schools in national technological innovation systems from multiple angles. In comparing research and development output among the countries, De Massis, Frattini, & Lichtenthaler (2013) used an assessment method and listed each country as technological innovation performance. The European

Union (EU) Member States ' innovation efficiency was adopted as the research subject by Baker (2012) to dynamically test their innovation effectiveness using the Malmquist Performance Assessment Index.

Technological innovation efficiency enhance organizations capacity through automation process and measuring organization future expansion which include market segmentation and customer support and research continues to grow; many scholars have begun to focus on applying technological efficiency and creativity in increase productivity within the organization (Damanpour & Aravind, 2012). Various scholars have studied the effectiveness of technological innovation at the regional level. It includes regional innovation technological efficiencies for some provinces and cities, the comparison of the technological innovation effectiveness of specific industries in different regions of China, and the effects on the efficiency of technological innovation of the various organizations within those regions (Zhang, Peng, Ma & Shen, 2017).

Following above discussions, items in questionnaire for technology efficiency include:

My company uses information technology to improve the levels of production through control process and Information technology assists my company in serving new market segments were adopted from (Lee, 2015) which studied expanding understanding of the innovation process through research and development. While Information technology increases my company's ability to anticipate customer needs developed from (Cooper, 2018) which investigated technological innovation factors including design practices and implementing strategies to enhance Information Technology system reliability.

International scholars studied the success of technological innovation in the industrial sector. Certain researchers measured and evaluated technological innovation efficiency from a vertical perspective in a particular industry. In recent years, scientists have focused more on assessing the efficiency of all-factor technology innovation and complexity and diversity characteristics during the model selection process, including using the Malmquist index model to measure technology innovation efficiency dynamically.

2.5.3 Innovation Technology, Reliability Theory

Different approaches to innovation are underlined depending on the discipline of origin of organization theory (economics, sociology, and technology). Most authors stress their search for new solutions that address customer needs and changes in the organizational environment by integrating well manufactured and technologies and high-quality software applications to increase productivity and reliability (Tidd & Bessant, 2018). Innovation is generally understood as the introduction of a new product, in particular the technological implementation in the mining industry. There are more erratic changes in organization, administration, and culture. Nevertheless, innovation novelty helps to understand the organization and create ways to maximize its potentials. Innovation can lead to success because of creating a new concept or idea (not just theoretical assumptions or a new idea). It is essential to implement technological innovation to improve level of production through automation processes by the use of available resources for firms to develop and expand rapidly and to generate socio-economic benefits such as economic profit, staff development, increased job satisfaction, corporate communication and to overcome competition within an organization (Walecka & Jankowska, 2015).

Following above discussions, items in questionnaire for technology reliability include:

The innovative software technology is reliable for my mining company to develop and expand rapidly and Technological software is reliable enough to succeed the system and For my company, the innovative devices are reliable that the staff can trust on with confident adopted from (Hadjimanolis, 1997) which investigated the management of technological innovation in small and medium size firms in Cyprus and concluded factors including system reliability and performance. While technologically, the devices we utilize do function as they are manufactured with latest innovation developed from (Camisón & Villar-López, 2014) investigated organizational innovation influence as an enabler of technological innovation capabilities and firm performance and concluded the importance of innovation in creating technological capabilities for firms to increase their performance.

Innovation and information technology reliability are vital the any organizations to build on organizational performance and competitiveness by adding well manufactured information technology and software applications to be integrated into all organizational functions in particular to enhance organization capacity to serve and expand new market segments and overcome competition and to utilize productivity through automation process (Bienkowska et al., 2017). Information technology appears to be required to assess the organization's data and enhance the capabilities further. Information technology reliability is, therefore, the critical element of this concept. When almost every company uses an information system of some kind, its reliability seems to be one of the key factors affecting the organization's competitive advantage by developing dynamic capabilities to benefit from information technology throughout the innovation process (Tworek, 2019). The reliability of information technology is understood as a measurable to its modification that is helpful to measure system resistor, its level of quality is identified, and potential problems are identified and are linked directly to the efficiency of information technology components, particularly critical for their proper operations (Tworek, 2019). This is important particularly for firms to enhance their customer services and ability to understand the customer's need and to improve labor and production process through automations.

2.5.4 Innovation Technology, Productivity Theory

It is found that most increases in the human standard of living have been due not to hours of work but to increased productivity i.e., increases in production efficiency as defined by output-to-input ratios). Slowdown preceded the great recession of 2008, showing that recession is not the only explanation of its trend, with slowdowns in the information technology sectors primarily taking place. This slowdown in productivity growth is contrary to the account of growing developments and the use of information technology. According to Zhang et al. (2017) productivity measurements, it highlights the importance of well manufactured and reliable technological applications in enhancing the problem-solving mechanism and firm capacity to expand new market segments. Furthermore Zhang et al. (2017) noted that economic activity is moving toward to areas in which production and output quality are difficult to measure, such as government, health, and finance. In rapidly changing technology, such as computers and the software industry, the measurements are challenging. Measuring output and productivity requires a deflator of output and input prices, which is an enormous challenge, reflecting quality changes. In the 1990s and 2000s, significant progress was achieved on improving price deflators for the hardware parts of information technology. Schumpeter in 1939 mentioned the importance of technological innovation and productivity. Schumpeter argued that those pursuing to generate income aim to create innovation. This result in a shift in the usage of the economy's current productive resources. Schumpeter claimed that creativity is a critical engine of competition and economic dynamics. He also claimed that creativity is at the heart of economic transition, triggering gales of "creative destruction," a concept coined by Schumpeter in Capitalism, Socialism, and Democracy. The first wave quickly arrived and reflected the electrification in the existing production organization. The second wave, delayed by several decades, reflected new ways to organize this new technology in production. It takes decades and may require additional "co-inventions" of new business practices and infrastructure. That may dramatically impact the size and distribution of the technological gains and the nature of their social effects to achieve the full productivity benefits resulting from new technology.

Following above discussions, items in questionnaire for technology productivity include:

My company is more efficient than the majority of its competition and my company is using more innovative technologies than the majority of its competition were adopted from (Csugány, 2016) which studied the duality of technological progress as features of innovation- and imitation-based economies while my company is using more innovative technologies than the majority of its competition developed from (BinZainuddin, 2017) which investigated effect of environmental turbulence on firm's technological innovation capabilities (TIC) and business performance in the automotive.

Recent evidence indicates that it is even more difficult to assess the quality improvements in hardware through cloud computing and other developments. One more important question is that productivity is neither a measure of progress in technology nor welfare. Productivity is based on the Gross Domestic Product (GDP) that is a measure of production or output in turn. However, advances in technology can increase welfare without increasing output. Johnson, Gardell & Johannson (2020) discussed the importance of quality improvement through computing technologies. According to Johnson, Gardell & Johannson (2020) technology productivity is significantly important to overcome competition by applying information technology through automation while technology efficiency focuses on information technology enhancing production through control process.

According to this perspective, progress would show up not in Gross Domestic Product (GDP) (but not in official productivity statistics) in broader measures of economic well-being. Although these measurement problems continue to be an active area of study, recent research indicates that only a small part of the productivity slowdown can be attributed to measurement problems. The reported slowdown in productivity growth in the information technology industry is also provisional. Larger businesses benefit from information technology productivity because significant changes in the organization and processes are typically necessary to use the accompanying investment in software and hardware to their fullest extent (Zhang et al., 2017). The researchers argue that electrification had distinct waves of impact on productivity.

2.5.5 Contingency Theory and Technological Innovation

Scott (2003) Lawrence and Lorsch (1967) coined the term 'contingency theory.' Scott (2003) further mentions that 'different environments through with a structure enhanced by technological innovation place differing requirements on firms. According to them, 'environments characterized by uncertainty and rapid rates of change in market conditions or technologies present unique challenges. Lawrence and Lorsch (1967) conducted empirical studies of various organizations to assess the relation between these types of environments ranging from high to low uncertainty and a variety of internal features of each type of organization environment through technological innovation mediation supported by theory of contingency between employees social aspects and control system to influence firm performance directly and indirectly in small and medium enterprises (Gërguri-Rashiti et al., 2017; Yunis et al., 2018).

According to Scott (2003) contingency theory is branch of system design: 'The best way to organize depends on the nature of the environment to which the organization relates. Donaldson (2001) mentioned that 'the organization becomes shaped by the contingencies.' Schoonhoven (1981) also found some empirical support for the hypotheses relating to contingency theory though the author suggests more complicated relationships than are assumed by the contingency theorists. Clearly the type of environment enhanced technological innovation have a significant impact on the firm involved.

Technological innovation is an important mediating factor between employee proficiency and attitude and control system toward organization performance based on contingency theory to improve strategic decisions to organization best interest (Parker et al., 2017). Therefore the effect of employees depend on strategic decision, training need and technological adoption to meet organization best interest. High operational uncertainty effect firm competitiveness and performance and by using technological innovation to enhance performance supported by contingency theory in order to enable self-organized adaption to the changing environment (Cherns, 1976).

According to (Kossaï & Piget, 2014) Innovation and technology play an important mediating role between operator's proficiency and technical aspects of adopting new technologies and effectively using them in corporate environment to influence performance supported by theory of contingency. Patterns of technology innovation for products and processes have been found to be the result of many different factors, including the need for improved firm performance (Mihalic & Bousinakis, 2013; Novac-ududec, Enache, & Sbughea, 2011). When endeavoring to observe the period and process of a technology's development, these approaches take into account a vast number of factors in all stages of firm development (Churchill & Lewis, 1983). Previous studies have reported the significant importance of timely access to reliable information, staff training indirect influence in increasing firms' performance and have highlighted the mediating role played by information technology enhanced by theory of contingency in this regard (Gërguri-Rashiti et al., 2017; Yunis et al., 2018). Studies have also pointed out the need for a further examination of ICT implementation by owner-managers in order to understand how information technology contingency is used to improve performance (Kossaï & Piget, 2014; Margarita, Fernando, Bayo-moriones, & Lera-lo, 2013).

The technological framework effects decision making on innovation in terms of reliability, system productivity, relative advantage, density, observability and security (Rogers, 2003). Understanding how technological innovation contingency acts in the relationship between organization environment and employees training need to control system and firm performance, provides guidelines for management practices in seeking to improve firm performance based on technological innovation and contingency theory (Akinwale et al., 2017; Ntemana & Olatokun, 2012). Relative advantage refers to the extent to which small and medium enterprises remark technology innovation as a better option than the idea it replaces (Akinwale et al., 2017). Technology reliability refers to the extent to which technology innovation is seen to be reliable with the principal standards, previous experiences, and needs of employees and new users (Rogers, 2003). Complexity is the extent to which small and medium enterprises perceive technology innovation contingency as a mediating factor between employees and operational control system to influence firm structural contingency and performance (Rogers, 2003). According to Roberts and Amit (2003), innovative enterprises have a competitive advantage that leads to high growth and business performance (Atuahene-Gima, 2004). The results of innovation appear in product, processes, markets, factors of technological productivity, reliability and efficiency which influence firm performance and organizational structures (Roach, Ryman, & Makani, 2016).

2.5.6 Technology-Organization-Environment Theory

The technology-organization-environment theory also known as TOE explain technological innovation implementation and adoption and how implementing technological innovations are influenced by social context, technological context and organization, environmental context. TOE was originally introduced by Louis G. Tornatzky and Mitchell Fleischer in 1990 (Tushman and Nadler 1986). The technological context refers to technologies relevant to firms, both technologies that currently in use and new technologies in market (Collins et al. 1988). Firm existing technologies are important in the process of implementation as a technological innovation has a mediation role empowered by TOE between employees and organization environment to operational control system and firm performance (Kossaï & Piget 2014).

Technological innovation influence firm by determining the limit of what is possible and by showing firm ways in which technologies can empower them and improve their operation, control system and performance (Ashrafi et al., 2014). TOE framework emphasize importance of innovation to create incremental, synthesis through new features or upgraded version of current technologies (Yousefi, 2015). Example include computer monitors, control devices, new software and hardware as well as management systems. Technological innovation produce synthetic changes, represent a middle point between employees' proficiency and attitude to use existing technologies, environmental dynamism, safety and firm control system and performance where existing technologies and ideas are united into a novel mean (Sadok, Chatta & Bednar 2016).

TOE context can be used for various empirical research. New technologies are developed and novel contexts for technological implementation can be identified, the necessity to understand the implementation of innovation in firms specifies that the TOE outline is capable of providing insights for researchers and practitioners. Information technology is an important infrastructure to connect employees, organization environment to sync with firm operation and performance as well as to connect firm to the world as it is vital for firm's growth (Rogers, 2003).

According to Ashrafi et al. (2014), technological innovation implementation supported by TOE contribute to the growth of organization through enabling employees and management interact and monitor organization systematically and firm to sync with its operation based on its goals and objective. According to Niebel (2018), various studies examined the relationship of technological innovation as a mediation between organization environment and employee proficiency and its effect on firm control system and performance by enabling firm to do business online, exploring new trade territories, improving firm information technology, system reliability and efficiency. Developing countries trail behind in implementing new technologies as they are less diversified in IT infrastructure, lack of facilities, technology capabilities and financial support, this along with poorly skilled employees to support the development (Yousefi, 2015). New technologies arrival such as mobile control devices, computing technologies has made it affordable and accessible for firms to adopt and implement new technologies as there are evidence to show positive mediating effect of technological innovation implementation for between organization, employees and firm control system and performance which show increased in firm market value, growth and production (Tarute & Gatautis 2014). Various theoretical models consider technology as a factor that effects the adoption of new technology innovations.

According to Baker (2012) firm must have a steady IT basis the new technology implementation to succeed. Firms which are that are familiar with technology are more likely to adopt innovations. Existing technology within a firm set a tone for the direction of technological implementation to be undertaken (Baker 2012). Technology capability is more than just having the equipment; it is important to have innovative and improve employee proficiency and training need to keep the firm ahead of its competitors (Metaxiotis 2009). According to Awa et al. (2015) in industries where competition is high it is important to adopt new technologies to rip the reward of using information technology.

A study conducted by Chiu et al. (2017) has revealed there is a relationship between organizations, employee through mediation of technological innovation empowered by TOE to influence organization performance and competitive advantage in developed countries using advance information and communication technologies. Technological innovation rely on external and internal support for implementation and maintenance as well as skilled employees to use procurement and enterprise system effectively (Ismail & King 2014).

Several research emphasize the role of technological innovation as a mediating factor enhanced by TOE between employees, organization environment and firm control system and performance (Chiu et al. 2017; Chiu et al. 2017; Maduku et al. 2016). Technological innovation implementation measured by innovation to provide relative advantages to improve as firm market value, growth, production and profitability in small and medium enterprises (Maduku et al. 2016). Recent research has greatly enhanced knowledge concerning the link between employees proficiency and training need along with corporate environment through mediating factor of technological innovation supported by Technology-Organization-Environment Theory to improve firm performance((Rogers 1995; Tornatzky et al. 1990).

Table 2.8 Concept synthesis of Technological Innovation

References of Literatures Review	Composition		
	Technology reliability	Technology productivity	Technology efficiency
Wu, Zhuo, & Wu, (2017)		*	*
Tworek, (2019)	*	*	*
Zhang et al., (2017)	*	*	*
Bienkowska et al., (2017)	*	*	*
Tidd & Bessant, (2018)	*	*	
Walecka Jankowska, (2015)	*	*	*
Johnson, Gardell & Johannson, (2020)		*	*
Total	5	7	6

2.6 Control System Concepts and Theories

There are several definitions to control system as, presented in Table 2.9.

Table 2.9 Definition of Control System

Researcher	Definition
Chenhall, (2003)	Consist of systematic use of management control procedures and loops to sync the system with overall objective of organization
Blevins, Wojsznis, & Nixon, (2018)	Access to the asset, resource, or system is controlled and restricted by procedures intended and established to control, record, regulate, supervise, and authentication
Merchant & Otley, (2007)	Provide information system that is useful for managerial decision-making, planning, monitoring, and evaluation of organizational activities

Access to the asset, resource, or system is controlled and restricted by procedures intended and established to control, record, regulate, supervise, and authentication (if necessary) (Blevins, Wojsznis, & Nixon, 2018). Control system provides information system that is useful for managerial decision-making, planning, monitoring, and evaluation of organizational activities to increase organization performance (Merchant & Otley, 2007).

The information system is designed to increase businesses ' value and profits. This is achieved by providing managers with timely and appropriate information to make effective decisions within a shorter time frame. Operational compliance shall improve awareness and ensure compliance with all legislation, guidelines, contractual arrangements, and obligations in control operations codices. Theoretically, a system with capabilities eliminates the need for any access control list or similar mechanism by giving all entities all the capabilities they need.

The literature around this vital topic is found in multiple disciplines with different theoretical backgrounds and concepts to seek an integrative perspective that draws these diffuse insights. Many studies investigated the recent phenomenon of information systems for governance, risk management, and compliance. Initially, it was designed as IT-enabled management control systems to respond to tightened regulatory requirements. Thus, it supports management to control activities through the automation of the management, measurement, remediation, and reporting of controls and risks against objectives following rules, regulations, standards, policies, and business decisions (Schermann, Wiesche, & Krcmar, 2012). More recently, however, organizations introduce it without actual regulatory need to support exploratory management control activities through establishing transparency and traceability in decision-making and new business analytics capabilities (Schermann, Wiesche, & Krcmar 2012). Consist of systematic use of management to sync the system with an overall objective of the organization through management controls loops and procedures (Chenhall 2003).

An essential aspect of management control activities is the nature of the information systems that support them, and so the goal of this research was to investigate the role of information systems (IS) in helping organizations address the challenge of achieving a trade-off between exploitative and exploratory management control activities. A complex relationship between information systems and management control is presented in the literature. Information systems help reduce the effort required to acquire, analyze, integrate, and report information on organizational behavior and outcomes. In doing so, IS establishes an integrated control overview, enables organizations to measure control effectiveness, and helps to support decision-making (Kim, Arcak, & Zamani, 2018). Further, information systems provide new capabilities for management control and evaluation as ‘‘data become accurate, shareable, and available to different parties without creating the panoptic dream of visibility and action at a distance (Lu, Shang, Li, Wu, & Zhang, 2018).

The researcher explains the rationale and benefits of information systems for supporting exploitative and exploratory management control and evaluation activities in the results section. In the implications section of the research, the author describes our grounded model and discusses its implications for theory and practice. Further, information system provides new capabilities for management control as ‘‘data become accurate, shareable, and available to different parties without creating the panoptic dream of visibility and action at a distance’’ and enhance evaluation system to identify and minimize errors and improve performance (Freeman, Harrison, & Zyglidopoulos, 2018). Control theory dates back to the 19th century when the theoretical basis for the operation of governors was discussed by James Clerk Maxwell and later advanced by Edward Routh in 1974. Control theory support the performance management system and evaluation, therefore overall firm performance by defining forms of control between the organization and the systems within (Pujiati, Misdiyono, &

Margianti, 2019). According to control theory, activities of all systems should be in sync with the overall goals and objectives of an organization (Barrows & Neely, 2012). An outstanding theory in innovation and competitiveness studies is the Resource-Based theory originally put forward Penrose (Penrose, 1959) but developed by others (Wernerfelt, 1984; Barney, 2001; Teece, et al., 1997). The theory argues that firms own resources which they can employ to become competitive. The theory posits that a firm can gain a competitive advantage by having distinctive resources or capabilities which are valuable, difficult to imitate and rare in the marketplace.

However, organizations introduce management compliance information systems, without actual regulatory need, to support exploratory management control activities through establishing transparency and traceability in decision-making and new business analytics capabilities (Schermann, Wiesche & Krcmar, 2012). According to Houpis, Rasmussen, & Garcia-Sanz (2018) quantitative feedback theory and robust control enhance system evaluation, effective communication and strategic planning in management control procedures toward covering a certain operating range, resulting in a better control system and stability and performance robustness.

2.6.1 Theory of Management Control System

The theory of management control system stress that every situation require a unique management control system to achieve some degree of efficiency and effectiveness. Several researchers emphasize the importance of control system acts as mediating role through management control system context between employee's social aspects which include training need and proficiency, organization environment, technological innovation and firm performance, provides strategies and procedures for management practices seeking to improve firm performance (Savall, 1975, 2003b, 2007; Savall, Zardet, Bonnet & Moore, 2001; Savall & Buono, 2007; Savall & Zardet, 2008). Several authors defined a control system as a procedure in which management use subjectivity, devices and regulation to influence the performance and comportment of employees and the system through control loops in firm in order to put their strategies into practice and thus achieved their objectives (Barney 1986; Bratianu, 2018; Henri, 2006) On the other side, it is known that this process involves supervision of individuals' performance and measurement (Ouchi, 1975, 1979).

The organizations' increasing awareness of the necessity for managerial information systems is related to their necessity of living together, not only physically but technically, socially, or financially, in a constantly changing environment. Thanks to the processes of globalization of the economy, this condition increased in the 1980s and 1990s (Johnson, 2011). In this new context, corporate managers had to adjust their corporate structure to these changes, schedule, control, and manage various decisions. This means that information systems must be adapted to each organization's goals, structures, and culture, as organizations seek, through these systems, to improve their capacity to coordinate the decisions of their members and identify possible problems.

Furthermore, opinions on this subject are highly diverse because while it is true that accounting control systems are essential for most authors, certain more critical authors do not believe that accounting systems are a definitive solution (Knights & Willmott, 2016). In recognition of their utility, they do not regard it as indispensable and argue, furthermore, that an ideal, perfect system cannot be developed that paves the road to obtaining the information necessary to plan and monitor the management of the organization. Management control research has gradually focused on budgeting as the key system out of all accounting control systems as it is the most frequently used system for organizational management. Management control theory helps in performance by evaluating the output of the system for its consistency with pre-defined sets of parameters through information system (Agyemang & Broadbent, 2015).

However, budgeting is not considered the only control system but must instead be supplemented, formally and informally, by other control mechanisms. The truth is that qualitative variables that are difficult to measure are becoming increasingly important. Johnson (2011) analyzed the relationship between the capital structure and control systems of the organization, concludes, this relation can be very complex as budgeting and accounting are not control systems as a formal control system, but depend instead upon good relationships and the other control mechanisms to meet certain preconditions (Johnson, 2011). In short, most control systems (budgets, accounting, and financial information management systems) are management systems that the management control system makes adjustments to environmental changes possible and provides feedback on performance, enables the benefit of products and clients to be evaluated, and enhance capital investment decisions making process through effective communication to senior management also to reduce conflicts and disputes to improve structural contingency toward achieving mission and vision of the organization (Rötzel, Stehle, Pedell, & Hummel, 2019). There are several studies to clarify and the improve management control system theory support for the mediating role of control system between organization environment, technological innovation and firm performance (Burrell and Morgan, 1979; Hopper and Powell, 1985; Chua, 1986; Laughlin, 1995; Fleishman, Kalbers and Parker, 1996; Llewellyn, 2003; Berry et al., 2009). The primary structure of the firm regulates what decisions are made; the decisions define the enduring resource necessities; and these in turn re-structure the firm. Therefore, the management control system significantly contribute to firm's structure. Furthermore Ouchi & Maguire (1975) studied on organizational control system in the structure of organizations, which includes mixture of training, socialization developments, power orientation, validation and measurement of results. Thus, they discovered organizational control system mediating role between environment, employees and know how to use devices, technological advancement and firm performance.

Following above discussions, items in questionnaire for control and information system include:

Mission of the organization is tied with the Information System and it is to the attention of managers and employees and I pay attention to the main factors that are believed as essential to the success of future global organization and I know the goals that are believed as the future success of the firm since they are widely distributed and presented to managers and employees were adopted from (Argyropoulou, 2017) which investigated information systems' effectiveness and organizational performance while I know the activities and processes required to ensure the success of the strategic plan adopted by the organization developed from (Chenhall, 2003) which studied integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes.

Management control was defined by Anthony (1965) as the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives. MCS seek to influence human activity within the company; they are formal or informal procedures and systems that can be identified by common management practices in a business that use information to maintain or alter patterns in an organizational activity (Mintzberg & Waters, 1985). MCS are comprised of multiple control systems that work together to enhance firm performance (Widener, 2007) for example, Performance Measurement Systems (PMS) are one important aspect of MCS and represent the process and the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely et al., 1994) by providing the information necessary to challenge the content and validity of the strategy (Ittner et al., 2003). Some MCS are formal such as planning, budgeting or reporting systems, monitoring procedures, project management systems, human resource systems, cost accounting systems or support decision making systems like SAP platforms or informal as weekly meetings, daily checks, emails, etc. (Simons, 1991). There is general agreement that MCS does not automatically improve performance, rather, performance is totally depended to how systems are designed, developed and used. Langfield Smith (1997) argues that the best way to approach the study of administrative controls is by looking at the different uses by those who apply them (Langfield Smith, 1997). This study combines two MCS classification of uses and relates both to identify the expected relationships: The theoretical proposition of Simons (1995) about levers of control (LOC) and Vandenbosch's (1999) executive support systems classification (ESS).

2.6.2 Resource-Based Theory and Organizational Dynamic Capabilities

Resource based view originally was developed in the area of strategic management with the intention to describe how firms achieve sustainable advantages and why firms attain different results (Wernerfelt 1984; Barney, 2007). Various researchers studied the principles of resource based view and dynamic capabilities literatures toward how firm outcome, control capabilities and operations in various level influenced by its resources and capabilities (Wernerfelt 1984; Barney 1991; Day 1994; Teece et al., 1997). Resource-based view focuses on strength driven specific internal resources and capabilities which are controlled by the firm to achieve competitive advantages (Lengnick-Hall & Wolff, 1999) and also conceptualize firms as groups of resources which their resources persist overtime (Barney 2001). Firm resources through organizational control capabilities are key to create competitive advantages (Baker & Sinkula 1999. Various researches support firm capabilities and resources (Widener, 2007) and entrepreneurial orientations (Ripollés & Blesa, 2005) are positively associated with performance. Several researches have greatly enhanced knowledge concerning the link between organization environment, employee social factor and technological innovation through mediation of control system enhanced by resource-based theory to improve firm performance(Djatikusumo ,2014; Mpofu, Milne; Watkins-Mathys ,2013; Alshamaila ,2013; Hung et al., 2016; Nguyen and Petersen ,2017; Kilangi ,2012; Baker ,2012; Tornatzky et al., 1990). Supervisors determine whether an organization could implement certain technology to meet firm system or not (Angeles, 2014; Findik, 2013). According to Kilangi (2012), management plays a central role in decision making and to support system for SMEs by providing strategies, roles and monitor control procedures.

Dynamic capabilities enable the firm to align its distinctive resources to create efficient control procedures and adapt to the changing business environment. Dynamic capabilities through enhancing control loops and adopting technologies improve the organization process and strategic planning to sync with its internal business system to generate long-term profitability for firms (Teece, 2007). The resources are the main source of competitive advantage for firm which include rare and valuable resources along with other resources that can't easily be replaced or produced (Wernerfelt 1984; Barney, 1991). According to porter (1980) competitive advantage is firm's ability to create value, position and distinguish themselves in various industries. Some researchers suggest which firm resources and capabilities are main determinant of firm performance (Hoskisson et al., 1999). Resources worth monitoring through firm control system to enhance value creation and performance (Penrose, 1995).

Capabilities are a link between resources and their deployment as they are organizational control routine and process to integrate, configure and release resources to create value and meet firms need and to create market changes (Grant 1996; Eisenhardt & Jeffrey, 2000). According to Santos et al. (2005) resource based view must identify, deploy and protect firm's resources and capabilities to ensure and sustain competitive advantages. Main research focuses for organizational capabilities include: innovation, market value and orientation, entrepreneurship, firm control procedures and employees proficiency, learning abilities (Covin & Slevin, 1991; Lumpkin & Dess, 1996; Ripollés & Blesa, 2005; Henri, 2006a; Henri, 2010). Resource based view and organizational capabilities have been comprehensively studied and support strong relation between organization environments, technological adoption through mediating role of control system to influence firm performance (Narver & Slater, 1990).

Following above discussions, items in questionnaire for capabilities include:

I believe that the existing structure allows adopting the system of performance evaluation that affects or is affected by Strategic Planning, My company adopts key performance indicators related to the goals and success factors of the strategic plan, My organization uses processes to evaluate individual, group and organizational performance adopted from (Orzoco, 2016) which studied the impact of management control system over capabilities and organizational performance, under the influence of perceived environmental uncertainty and my company' s level of performance is required to achieve each of the areas defined in setting the goals developed from (Wijethilake & Ekanayake, 2018) as they investigated control system framework influence on corporate performance.

2.6.3 Contingency Theory and Control System

Contingency theory emphasize that there is no best way of designing control system and management as every situation needs a unique system to be successful as every optimal management system are contingent upon various internal and external factors. Lawrence and Lorsch first explicitly used the term "contingency theory" (Johnson & Gill 1993). The design of management control systems is influenced by the unique variables depends on the situation, it needs to be modified. According to Burns and Stalker (1961) suitability of different form of organization are depended on particular environment variables such as dynamism through mediation on control system to effect firm performance.

There are several contingency designs and setting in control management systems that are influenced by firm's endogenous and exogenous factors. On the other hand, it states that it is still possible to develop the general rules and models for the major classes of business settings. Contingency theory in control system is based on key ideas which include firm design must "fit" the environment and successful firms not only have a proper "fit" with its environment but also between its subsystems through mediation of control system between organization environment, employee social aspect of operator proficiency, information technology and firm performance. Contingency framework enhance defining the control system procedure to be applied a function in a project features. Contingency framework is used in information and control system focus on the relationship between control mechanisms to sync with organization environment (Blau, 1972). Contingency theory in control system asserts that environments with greater degree of uncertainty and complexity are better off in management when relying on controls procedures (Hopwood, 1974). Information system is an important part of organization control system, as there is a strong linkage between information system and strategic function of an organization (Dalton, 1971; Otley, 1980; Child, 1972; Thompson, 1992).

Management control procedures through firm's formal control system applied to influence daily efforts of an organization's employees. Task control comprises the firm and employees as they are involved in operational process. Task control is transaction-orientated; that is, it contains the control of employees' daily tasks. Guidelines to be followed in undertaking these tasks are arranged by the management control procedure. The aim of task control is to assure that specific tasks are undertaking efficiently and effectively (Anthony and Govindarajan, 1998). Several researches have greatly enhanced knowledge concerning the link between organization environment, employee social factor and technological innovation through mediation of control system enhanced by Contingency Theory to improve firm performance (Djatikusumo ,2014; Mpofu, Milne; Watkins-Mathys ,2013; Alshamaila ,2013;Hung et al., 2016; Nguyen and Petersen ,2017; Kilangi ,2012; Baker ,2012; Tornatzky et al., 1990).

2.6.4 Design-Compliance Theory

At the end of the 1990s, neo-institutionalism was founded by socio-legal scientists. It conserved several things: a consistent account of the uncertainty and chaos of organizational choices, the importance of institutions in structuring decision-making processes, and a general objective of legitimization forcing organizations to develop or conform to institutions. The effort made to reconcile different dimensions of choice is one of the advantages of neo-institutionalism for compliance studies: cognition (perceive, know), affect (feelings, moral commitment), and evaluations (calculations). As Swarbrooke (2012) noted, the neo-institutionalist approach offers several solutions to integrating these diverse logics. The concept of a rational individual has retained economists (and several political scientists) to maximize its interest. They have, nevertheless, also incorporated the rationality limits and the role of social standards through institutions that restrict the choices of stakeholders. In other words, stakeholders maximize usefulness within institutions' limits through control compliance. Assuming a preeminent logic of appropriateness, the author stress the importance of the routines of action and the role of confidence relations in maintaining the rules of conduct and regulations. Its emphasis even as they insist on the possibility of consecutive anticipatory behavior.

Following above discussions, items in questionnaire for operating compliance include:

My company's control system adopts the organization processes and activities that it deemed necessary to ensure its success and I received in formal character the strategic plan implemented in the organization through direct communication by the senior management of the company were adopted from (Egbe, 2015) which studied the design and use of management control systems in a multinational enterprise and I know the mission and vision stated in the strategic plan of the institution since they are widely disseminated and presented to managers and employees adopted from (Argyropoulou, 2017; Saif, 2015) which investigated information systems' effectiveness toward organizational performance.

Many studies argue that institutions define actors' preferences and thus link a logic of consequences to a sense of appropriateness. This analysis shows that there is even a need for the pursuit of individual interests. "New socio-legal institutionalism and naturalism. Actions and social relations may therefore have both a symbolic and an instrumental dimension. The co-existence of competing for institutional orders structuring the behavior of actors can contribute to explaining the various observations. An "institutionally rational" actor appears in these studies (McFarlane, Giannikas, Wong, & Harrison, 2013). According to Etienne (2011) design compliance theory is a goal-oriented theory that improves the system by strategic planning, effective communication and reporting to management through automatic, routine, or habitual behaviors.

To study conformity, the main interest of the neo-institutional approach is that it conceptualizes institutions' influence on compliance. In particular, where legal requirements are ambiguous or contradictory, this enables the assessment of conformance due to institutional isomorphism. Another helpful element in this study is emphasizing the role of myths and symbols in decision-making and behavior. Institutionalized organizations, Swarbrooke & Page (2012) also demonstrate the importance of proper compliance. This trend –known in socio-legal ways -corresponds to cases where recipients formally comply with non-compliance. It is also possible to present new arguments to explain variations in applying policies by neo-institutionalism that contribute to interpersonal relationships and trust in interactions. Interactions between regulators can influence confidence (Swarbrooke& Page, 2012).

In addition, neo-institutionalism offers few things to predict when a decision is likely to be structured by institutions. Finally, neo-institutionalist authors view the law that contradicts the emphasis that they take for granted on fluidity otherwise. The law is the last producer of routines and compliance for many of these scholars. The problem of conflicting rules in that sense is ignored by neo-institutionalism. There can be conflicts between legal rules and social norms or between laws. In contrast, the socio-legal approach is central to this problem (Swarbrooke & Page, 2012). Below table present Concept Synthesis of Control system**:**

Table 2.10 Concept Synthesis of Control system

References of Literatures Review	Composition		
	Control and Information System	Operating Compliance	Capabilities
Freeman, Harrison, & Zyglidopoulos, (2018)	*		*
Agyemang & Broadbent (2015)	*		*
Etienne (2011)		*	
Houpis, Rasmussen, & Garcia-Sanz (2018)	*	*	*
Lu, Shang, Li, Wu, & Zhang, (2018)	*		*
Pujiati, Misdiyono, & Margianti (2019)			*
Rötzel, Stehle, Pedell, & Hummel (2019)	*	*	*
Teece (2007)	*	*	
Total	6	4	6

2.7 Related Studies

Existing literature has given inconclusive proof of the effect of firm performance on environmental policy in the mining industry. Various researches suggest that the impact of corporate performance is unlikely to be monotonic but will instead differ with the life cycle. Some researchers on firm performance studies tested this hypothesis using dynamic and static methods on African companies ' panel information. The findings support the researcher's hypothesis that organizational policy has the most significant effect on the maturity of the firm life cycle and the lowest impact in the fast development phase. Hence, the researcher brought some related studies as follows:

Soares and Perin (2019) shows that entrepreneurial direction affects performance indices, including financial performance and relative market value. In addition, entrepreneurship interacts with market orientation to enhance efficiency. Personal Resource Management is a critical business orientation element. This indicates that a company can improve its efficiency by taking a strategic position for innovation, proactivity, and risk-taking. Chege, Wang, and Suntu (2019) conceive two main organizational characteristics of cooperatives: the cooperation structure in terms of controls, ownership, and cost. Researchers conceptualize and test the effect of these organizational characteristics on market orientation and performance in a cooperative firm based on a sample of Dutch cooperatives. However, the systematic effect of the cooperative structure cannot be established. The researcher presumes that market focus and efficiency are affected by the structural characteristics of cooperatives and by the culture of the cooperative company. Interdependent structure-result relations cannot be excluded a priori due to system monitoring and feedback on organization performance.

However, if unilateral causal relationships appear valid as structural features are core cooperative variables that alter progressively only in comparison with outputs, performance is a volatile one. For example, Ramanathan (2018) has concluded that prior financial achievement has a significantly positive effect on subsequent social and organizational environment performance even after control of the size of a corporation and the type of industry, a conclusion supported by Soares & Perin (2019) Value discipline clarity shows little impact on corporate performance, whereas market orientation and organizational learning make a significant contribution to corporate performance. The link between learning and company results is moderated by trust and engagement.

Lee, Cin, & Lee (2016) studied the effect of an efficient decision-making method over the years; analysts and managers have struggled to conclude it; this latest research shows that greater levels of integrity are positive but meaningless for companies facing turbulent circumstances. The theory construction and empirical outcomes of the current study indicate a solution to the puzzle: comprehensiveness and efficiency are more complicated than past studies.

Rosen and Kishawy (2012) studied the importance of incorporating sustainability into production and design alongside other goals such as function, competitiveness, profits, and productivity, which are discussed by the Faculty of Engineering and Applied Sciences, University of Ontario. It highlights the need to use the appropriate tools such as organization environment design, assessments of the life cycle, and other environmentally sound practices which know the entire process or product cycle. Sustainability and environmental management are likely to become more significant aspects of production and design in the future and are likely to affect key priorities for advancing production and technology operations in the mining industry. The improvement of design and production is often successful for designers and producers who focus on sustainability and build a culture of business sustainability in the mining industry.

Various researches suggest that further investigation and cooperation are needed to improve understanding of the sustainability of operation and design and increase the transfer of technology and sustainability. This stems from the precise role in protecting the environment and sustainability and their enormous economic growth and competitiveness potential. Their study helps to clarify dissemination models and challenges for policymakers in terms of policy design, the levels of diffusion achieved, and the factors affecting the dissemination of a particular technology in environmental issues.

Moreover, Qureshi, Rasli, and Kowang (2015) studied the manufacturers to integrate the social and environmental factors into their production processes to protect society and the environment from the harmful impacts of the manufacturing process. This adaptation caused technological and procedural changes, which altered the basic production concepts significantly. Their study offers fundamental changes to the fundamental principles of the green manufacturing paradigm and ultimately leads to the new sustainable manufacturing paradigm. The concept of sustainable production is a broader one, focusing on social, environmental, and economic factors integration in production methods. The literary review concluded that processes of transformation had undergone significant variations in paradigm shifts. In brief, the changes to work design practices relating to sleek, sustainable production paradigms should be highlighted in this section. Enhancing sustainable production, process concepts, and concerns lead to changes in production dimensions (Kimbugwe, Perkidis, Yeung, Kerr, & Perdikis, 2012).

Li, Zhou, and Wang (2010) studied a total of 469 companies that remained in the sample was implemented besides interviewing 43 managers of mining companies. After companies lack either financial or corporate social performance (CSP), this study has attempted to address what has become a perennial question: whether corporate social performance is linked to financial performance and, if so, in what direction the causation runs. In undertaking the study, they explore whether or not strategic linkages exist between CSP behaviors and financial performance. Using a greatly improved source of

CSP assessments, they evaluated the association between financial and social performance when CSP was both a dependent and independent variable. Their data set included most of the S&P 500 firms. In support of those studies that have positive linkages in the past Soares & Perin (2019) found using this improved measure that CSP does depend on financial performance and that the sign of the relationship is positive. That is, in support of the slack resource theory, firms with slack resources potentially available from strong financial performance may have greater freedom to invest in positive CSP. Thus, it may well be that firms with available resources may choose to spend those resources on 'doing good by doing well,' and that those resource allocations may result in improved CSP overall.

Rodriguez etl. (2017) and Schaltegger & Wagner (2017) and Boons, Carlos, and Quist (2012) argue that environmental dynamics are a multidimensional construction with dimensions that affect the importance and ease of balance between efficiency and flexibility rather than being just stable or dynamic. They describe how executives balance efficiency and flexibility, not simply with contradictions, through cognitively sophisticated and single solutions. They offer a better view of how leaders can balance efficiency and flexibility by highlighting simple rules and strategies in organization dynamic environment.

Camisón and Villar-López (2014) investigate the hypothesis that the combination of three related innovations—1) information technology (IT), 2) complementary workplace reorganization, and 3) new products and services—constitute a significant skill-based technical change affecting labor demand in the United States. Using detailed firm-level data, they find evidence of complementarities among all three of these innovations in factor demand and productivity regressions by distributing 650 surveys among the company's executive managers. In addition, firms that adopt these innovations tend to use more skilled labor. The effects of IT on labor demand are more significant when IT is combined with the particular organizational investments we identify, highlighting the importance of IT-enabled organizational change.

Saeidi etl. (2015) emphasized that social factor is seen as critical to innovation and business performance in China. This paper seeks to research the effects on the technological and organizational invention of the key dimensions of HRM. The research uses a sample of 194 high-tech companies in eight provinces in China. Their research shows that training, motivation, and control of processes for employees have positive effects on technological innovation, while material motivation and control of results have an adverse impact on technological innovation.

Table 2.11 Related Studies

Authors	**Findings**
Ramanathan (2018)	Concluded that financial achievement has a significantly positive relation to subsequent social and organizational environment performance despite corporation size and the type of industry.
Lee, Cin, & Lee (2016)	Studied the effect and importance of efficient decision-making methods for managers within the organization using technologies.
Soares & Perin (2019)	Discovered that entrepreneurial direction affects performance indices, including financial performance and relative market value.
Chege etl. (2019)	Studied organizational characteristics of cooperation structure in terms of controls, ownership, and cost and concluded its importance toward firm performance.
Schaltegger & Wagner (2017)	Found that environmental dynamics are a multidimensional construction with dimensions that affect the importance and ease of balance between efficiency and flexibility within the organization

2.8 Hypothesis Development and Analysis of Relationship between Variables

Scope of Variables

The variables used in this research were studied, reviewed, compiled, and collected from research variables concepts, theories, literatures, and related researches from various sources, in both domestic and international sources, and then are summarized into variables for this study as follows.

Exogenous Latent variables

Organization Environment

Organization Environment Observing Variables:

Environmental Comfort

Environmental Dynamism

Environmental Safety

Mediating Latent Variables

Social Factor, Technological Innovation, Control system

Social Factor Observing Variables:

Social Attitude

Operator Proficiency

Training Needs

Technological Innovation Observing Variables:

Technology Productivity

Technology Reliability

Technology Efficiency

Control System Observing Variables:

Control and Information System

Operating Compliance

Capabilities

Endogenous Variable

Firm Performance

Firm Performance Observing Variables:

Profitability

Growth

Market Value

Initial Hypothesis Development

In order to confirm whether determinants variables and representative indicators of gold mining firm performance are in line with results from reference literatures and pertaining theories, or not, including the principal theories of this research: resource-based view and dynamic capability theory, contingency theory and stakeholder theory and concepts and literatures for latent variables (social factor, organization environment, control system, technological innovation and firm performance) along with observing variables. This structured investigation is based on the objectives and research questions and to discover the relationship between variables that influence gold mining firm performance in Eastern African Community, this study uses structural equation model to explore results.

The initial SEM hypotheses are as follows:

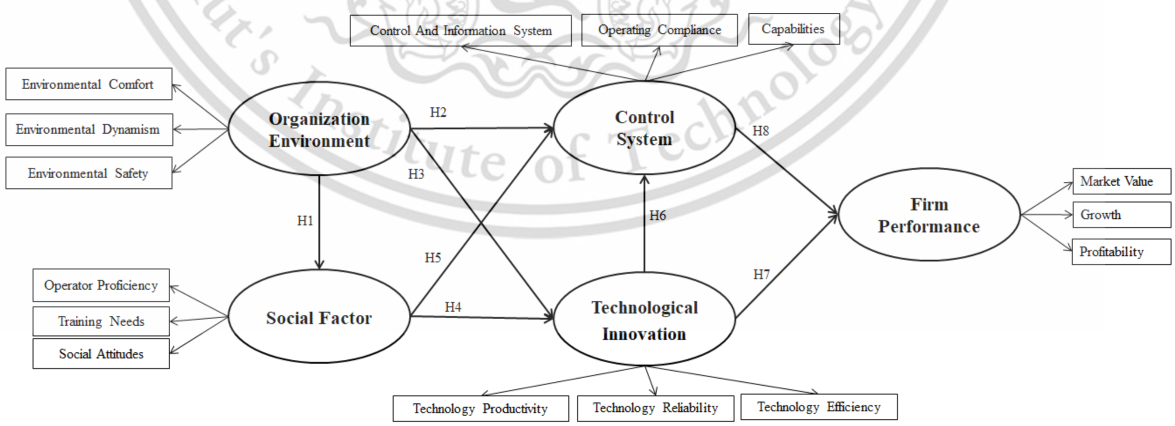

Figure 2.2. Conceptual Model for effects variables on gold mining firm performance**.**

Note: The figure shows the relations of organization environment to social factor toward technological innovation and control system that affect firm performance.

After all SEM hypotheses were established, relationships between each pair of latent variables have to be supported by relevant studies from literature review to ensure that reasons do exist and endorsed by theories. The supported relationships between each pair of latent variables are described in detail the following sections.

2.8.1 Relationship between Organization Environment and Social Factor of East African Gold Mining Companies

According to Kohun (1992) organization environment is a sum of interrelationship that exists within employees and the working environment which consists of actions that potentially contend with the employee's activities and performance. It depends on organization dynamism that enables how sharing knowledge and training influence employees' proficiency and attitudes (Brenner, 2004). Organization environment allows effectiveness in a working environment which influences employees' effectiveness and productivity (Brenner, 2004). He argues a dynamic organizational environment intended to ensemble employee's satisfaction and exchange of ideas and knowledge that inspire employees towards higher productivity. According to Opperman (2002) the organization environment refers to peers, others with whom employees relate, team and work groups, interactional issues, leadership, and management. This environment is designed in such a way that encourages informal interaction in the workplace so that the opportunity to share knowledge and exchange ideas could be enhanced. Organization environment relation to social factor reflects relevant environmental characteristics of the environment such as environmental dynamism and safety in structural contingency theory which the firm operates, integrating various aspects which create corporate culture that significantly influence employees attitude, proficiency and technical training need to cope with company's goals and values (Certo and Peter, 1993; Hitt et al., 2008; Catelli, 2001; Stoner and Freeman, 1985).

Firms reconsider their operational routine if environment dynamism is unpredictable (March, 1991). According to Helfat (1997) the organization dynamic capabilities enhance employees' technical training and proficiency in responds to changing environment and conditions. Organization capabilities is the ability of firm to utilize organization resources and employees proficiency to coordinate task in alignment to achieving superior results (O`Regan and Ghobadian, 2004). The relation between organization environment through contingency and employee's attitude, proficiency and technical training are well researched, especially for large corporations (Barney,1991; Peteraf, 1993; Teece et al., 1997; Amit and Schoe maker, 1993). Furthermore other researchers focused on understanding the applicability of dynamic capabilities theories on organization dynamic capabilities in aspect of organization environment characteristic toward employee's proficiency in micro enterprises (Teeceet al. 1997; Eisenhardt and Martin 2000). However researchers also investigated the role of managers and stakeholders in building and deploying dynamic capabilities in an organization (e.g. Galunic and Eisenhardt 2001; Zahraet al.2006).

Organization structural contingency view reflect organizational dynamic environment and comfort in influencing employees attitude and interaction with each other and the role of managers in providing necessary technical training to enhance employees proficiency (Kim, 2005; Foss et al., 2010; Argote and Miron-Spektor, 2011). The relation between organization structural contingency and dynamism and employees training and learning abilities toward enhancing knowledge management in the organizations have been well regarded by researchers (Curado, 2006; Willem and Buelens, 2009; Bunderson and Boumgarden, 2010; Martínez-Leon and Martínez-García, 2011; Bresman and Zellmer-Bruhn, 2013). Employees also experience different approaches to problem solving which depends on organizational environment (Knowles et al., 2012; Argyris and Schön, 1996). Training in an organization and their learning style specify their behaviors and preferences on what loops to use to seek knowledge (Argyris and Schön, 1978; March, 1991; Simon, 1991).While organizational environment comprises systems, procedures, practices, and values. Management has control over the organizational environment.

Measurement system where people are trained and rewarded to increase motivation and collaboration in team work and groups effectively, therefore organization environment influence employee's proficiency and training need. Employees' working environment relies on internal factors such as skills, intellectual capacity, and resources as a consequence for employees to meet the required standards in the organization. Skilled employees through procedures, technologies, and innovation increase firm performance. According to Suwati, Minarsih, and Gagah (2016) have shown how working environment can influence that the main goal for employees who seeks financial and non-financial goals to reach self-satisfaction. Organization environments are not without impairments, the problem is the poor environment, lack of a safe and comfortable environment. However, since every organization is a combination of people, external and internal factors which influence it , that people's performance is, as a consequence, organizational performance (Bin Dost, Shafi, and Shaheen, 2011; Solomon, Hashim, Mehdi and Ajabe, 2012). Various factors influence the employee's attitude, proficiency, and performance including equipment, physical work environment, standard operating procedures, the reward for good or bad systems, performance expectancy, feedback on performance, in addition to knowledge, skills, and attitudes (Stup, 2003). According to Bevan (2012) employees' proficiency and performance are significant factors influencing the profitability of any organization.

The physical work environment can hinder and mediate with, or set limits on the range of behavior that influence task performance. According to stakeholder theory, stakeholders are groups or individuals which influence organizations to achieve their objectives through providing a safe and dynamic environment for employees to interact and to promote employees' proficiencies (Brenner, 2004). The dynamic capability theory focuses on how firms create value for competitiveness in a dynamic environment, a dynamic environment influences organizational core and values which influence employees' attitudes and proficiency within the organization, toward achieving the overall objective of the firm (Teece et.al., 1997). According to Lawrence and Lorsch (1967), structural contingency theory emphasizes firms in a dynamic, changing environment to increase employee performance and establish an efficient organizational structure.

According to Tella, Ayeni, and Popoola (2007) that well-managed organizations with sufficient management, view employees as the main root to gain quality and productivity within departments. Employees' proficiency and performance are significant factors influencing the profitability of any organization (Bevan, 2012). Performance is important for organizations as employees' performance leads to business success. Also, performance is important for individuals, as achieving tasks can be a source of satisfaction (Muchhal, 2014). Job performance can be defined as attitudes or activities that are performed towards accomplishing the organization's objectives (Motowidlo, Borman, and Schmit,1999).

Table 2.12 Relationship between Organization Environment and Social Factor

Authors	Findings
Muchhal, (2014)	Studied organizations environment influence on employees' performance which leads to business success.
Bevan (2012)	Employees' proficiency and performance are significant factors influencing the profitability of any organization.
Suwati, Minarsih, and Gagah (2016)	Explored the main financial and non-financial goals of employees which led to self-satisfaction in an organization
Tella, Ayeni, and Popoola (2007)	Mentioned a well-managed organizations with sufficient management, view employees as the main root to gain quality and productivity within departments.

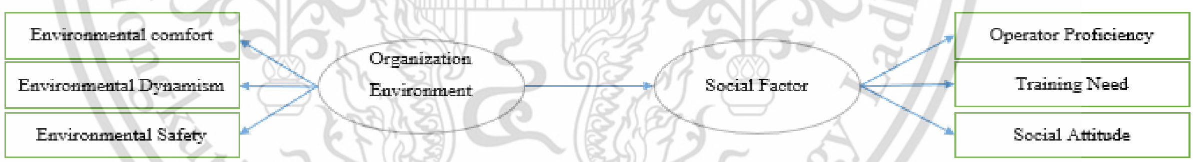

Figure 2.3 The linkage between Organization Environment and Social Factor

Having reviewed the above, the following hypothesis is provided:

Hypothesis 1. Organization Environment Affects Social Factor of East African Gold Mining Companies

2.8.2 Relationship between Organization Environment and Control System

The environmental characteristics mechanism must align with an enterprise goal to succeed, and the control system itself has to adapt to this environment (Yafi, Tehseen, & Haider, 2021). In other words, self-regulation of the system of companies, the solution of both strategic (environmental) and operational (efficient application of plans designed to achieve overall objectives) challenges (Nolan, & Morley, 2014). All of this means that the control process must be taken into account in two dimensions: one social and the other organizational. This applies to the organization's transformation, taking into account profitability and business factors against the social determinants of the society (Lamarche and Maillet, 2016). Companies are continually aware of the need for information systems for management purposes as they need to co-exist, not just physically but technologically, socially, and financially, in a continuously evolving world (Jaiswal, Kaushal, Singh and Biswas, 2021). When this new context, its company structure has to be tailored and different types of decision-making planned, supervised, and managed. This means that information systems must be adapted to each company's goals, structure, and culture as companies seek to improve their ability to organize their decision-making processes and recognize problems that might occur from these systems (Islam & Tariq, 2018).

According to Norins (1990) in describing some characteristics of an ideal environment for creativity: cultivation of a pro creativity culture; provision of incentives and recognition for creative ideas and work; provisions of the best possible tools for interchanging ideas; and the best possible training. The relationship between organization environment and control system has been reviewed by various researchers which review organization environment characteristic such as dynamism, safety and comfort to internal control system and capabilities of the organization procedure to robust the system and minimize errors, based on original research of Donaldson (2001) and Lawrence and Lorsch (1967) on structural contingency theory of organization and capabilities which the firm operates, integrating various aspects through creating a dynamic organizational environment where its safety and comfort influence control loops, capabilities and procedures from both human capital and control system efficiency perspective (Certo and Peter, 1993; Hitt et al., 2008; Catelli, 2001; Stoner and Freeman, 1985). Other researcher also explored resource-based view and how organization dynamic environment, comfort and resources significantly influence internal management control system (Henri, 2006a;Wernerfelt, 1984). According to Simon (2000), formal managerial procedures in organization is used to maintain organization activities. In a dynamic organization environment where employees and management work effectively enhance organization management control capabilities and system efficiency (Alegre and Chiva 2008; Akman, & Yilmaz, 2008; Argyris and Schon 1978; Calantone et al. 2002; Chipika and Wilson 2006; Helfat and Raubitschek 2000; Sinkula et al. 1997).

Information system and innovation bounded to firm management routine and identifying control centers in internal operation (Li et al. 2016; Xie et al. 2016). Simon research in (1995) explored different level of control that enhance success for organization strategy which include belief systems, boundary systems, diagnostic control systems (DCS), and interactive control systems (ICS). Various researchers studied organization resource based view along with structural contingency approach and influence where organization environment cultural, dynamism and comfort influence formal feedback system to monitor organization outcome and minimize error to enhance standard of performance (Gond et al. 2012; Lueg and Radlach 2016; Tucker et al.2009; Arjaliès and Mundy 2013; Lisi 2015; Besio and Pronzini 2014; Bruininget al. 2004). Structural contingency theory of organization predict the relationship between organizational environment characteristic such as dynamism, resources, comfort and safety through management control system and capabilities to improve organization performance based on specific situations and contingencies(Galbraith, 1973, Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Hayes, 1977; Otley, 1980). According to Lind & Kraus (2010), structural contingencies within an organization environment significantly influence management control system and capabilities. Other researchers focused on structural contingency influence on strategic orientation and management decision making (Ittner et al., 2003;Govindaraján, 1984; Hoque, 2004; Hall 2008; Chenhall, 2005) and comprehensive human capital, employees proficiency and comfort in organization relation to control and information system capabilities and efficiency (Chandler and Hanks,1994; Naranjo-Gil & Hartmann, 2007a, 2007b). Management use interactive control system to minimize error, underlying action plan and implementation and obtain knowledge about strategic uncertainties which can enhance organization's strategic plan development (Bedford 2015; Shapiro, 2016).

The dynamic capability theory focuses on how firms create value for competitiveness in a dynamic environment (Teece et.al, 1997). The dynamic environment influences the organizational internal system to manage, operate and sync with the overall objective of the firm. According to Lawrence and Lorsch (1967) while structural contingency theory emphasizes firms in a dynamic, changing industry to those in a stable, established industry and found important structural differences. In the stable industry, successful firms relied on formal rules with decision-making very centralized, and narrow spans of supervisory control toward its performance. In the more dynamic industry, spans of control were wider, with less formality and less centralization. In other words, they found that an organization's structure and the environment were contingent on the kind of environment in which it was operating, therefore influencing the organization’s control system and operation.

Furthermore, opinions on this are enormously different since, although efficient control systems indeed succeed by provision from the organizational environment, which is considered especially important as cited by most researchers, some more critical authors feel that systems are not an enduring solution. While distinguishing its usefulness, it considers it indispensable and argues that an ideal, perfect system cannot be established without a strong organizational environment and structure, which paves the way for information required for organizational management planning and management control. According to Freeman (1984) stakeholder theory focuses on how and what stakeholders analyze and scan the organization environment, operation to identify threats and opportunities which include its safety and dynamism that influence firm control system and result in improving the organization performance. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. Stakeholders through a dynamic environment influence firm internal control procedures which affect firm’s outcome in terms of growth. According to the balanced scorecard model, firms may have resource limitations, a balance needed in terms of designing strategies to create value results and organization objectives as diversity exists in stakeholders’ interest, also for firms as a dynamic organization environment technological changes and procedures influence how control system proceeds and affect firm performance (Greenley & Foxall, 1997). In a dynamic environment, stakeholders have power and influence over the kinds of technologies firms adopt to increase organization performance as stakeholders are affected by the firm’s outcome in terms of growth and profitability (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999).

The management control system allows adaptation to environmental change, offers performance feedback, makes it possible to determine the advantages of the goods and customers in the decisions on capital investment (Vohra, 2015). It also aims to reduce internal disputes and tensions and to make monitoring easier for external factors. Although the number of researches on this subject varies, most authors point out that still many facts are pending to create an ideal system, particularly if current systems critics are taken into account (Lamarche and Maillet, 2016). In the light of the preceding, while certain systems can often be improved and the organizational environment affect the control system both from information devices and staff involved in the process. In changing the environment, organizations need reporting systems that identify problems, changes, and conflicts. In addition, the organization must stimulate its curiosity, promote the decision-making process and increase its capacity to face environmental changes (Rizvi and Garg, 2021).

Other researcher also explored the importance of organization dynamic environment, comfort and resources influence internal management control system particularly in service sector (Henri, 2006a; Wernerfelt, 1984).

Table 2.13 Relationship between Organization Environment and Control System

Authors	**Findings**
Yafi, Tehseen, & Haider (2021).	The environmental characteristics mechanism must align with an enterprise goal to succeed, and the control system itself has to adapt to this environment.
Islam & Tariq, (2018)	This means that information systems must be adapted to each company's goals, structure, and culture as companies seek to improve their ability to organize their decision-making processes and recognize problems that might occur from these systems.
Jaiswal, Kaushal, Singh and Biswas, (2021)	Companies are continually aware of the need for information systems for management purposes as they need to co-exist, not just physically but technologically, socially, and financially, in a continuously evolving world.

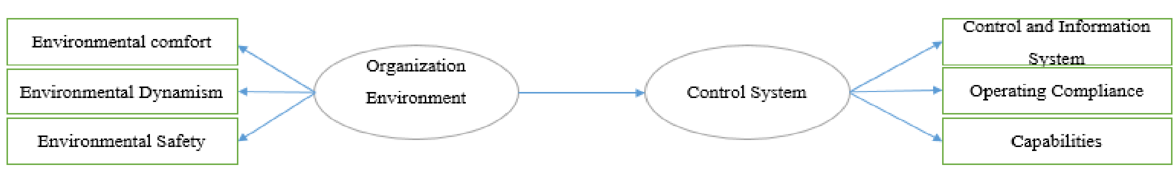

Figure 2.4 The linkage between Organization Environment and Control System

Having reviewed the above, the following hypothesis is provided:

Hypothesis 2. Organization Environment Affects Control System of East African Gold Mining Companies.

2.8.3 Relationship between Organization Environment and Technological Innovation

Baker (2012) mentioned, various aspects that localized data and technology spillovers can encourage innovation while there are strong connections between innovation, growth, and organization as well as applying organizational safety and dynamism toward technology productivity (Jia, Guo & Barnes, 2017).

Binz, Truffer, & Coenen (2014) also focused on how innovation can be promoted particularly regarding the link between multinational cooperation success through involving a safe, dynamic environment for employees in the organization and by applying creativity, innovation, and technologies in the organization toward achieving long term and short-term objectives. The importance of innovation and technology is widely acknowledged in many fields of international development (Binz, Truffer, & Coenen, 2014).

There have been two broad subjects in environmental literature researched in the connection between development and strategy. Early work focuses on theoretically designed to assess the impact of various environmental policy processes (e.g. standardized norms, emission taxation, and tradable licenses) on economic growth. These suggest that theoretically precise ranking of products is ambiguous and depends upon several factors such as level of integrated technologies, upgrades, and creativities applied to the products, directly impacting its success (Abdul Basit & Medase, 2019). The relationship between organization environment and technological innovation is adopted from study of Burns & Stalker (1961) and Lawrence and Lorsch (1967) regarding management and operational mechanism between stable organization environment and routine technological innovation based on structural contingency theory of organization and capabilities observing that different units of an organization face different types of environments, found that each subunit develops a structure matching its environment , develop capabilities which led to enhancing technological adoption and procedures toward firm performance. The relation between organization environment, its characteristic and contingencies toward technological innovation which enhance managerial decision making and productivity and management system accuracy emphasized by various researchers (Hwang and Min 2013; Lau 2014; Hammad, Jusoh and Oon 2010; Cooper, Patel and Thatcher 2014; Souchon et al. 2016, Wang and Bao 2017, and Hmieleski, Carr and Baron 2015). Although managerial practices and decision making depends on environmental characteristic and available resources to obtain right framework and enhance performance measurement. According to structural contingency theory assumption a dynamic organization environment and structure through technological procedures and system efficiency present better result and increase performance (Woodward, 1958, 1965; Lawrence Lorch, 1967; Thompson, 1976). Organization dynamic environment, comfort and facilities can significantly influence technological advances, system reliability and productivity which enhance firm strategic plan, management decision making and performance (Hendry and Stevenson, 2016; Souchon et al 2016; Megginson et al., 1998). According to Thomson (1976) organization environment and characteristic depends on specific contingencies to enhance technological productivity, reliability to minimize uncertainty and maximize performance in the organization. According to (Mintzberg, 1979; Donaldson, 2001) organizational design and structure influence employees proficiency and learning abilities to adopt new technologies. Organization learning is necessary for employees proficiency and also to understand the core and objective of organization to increase performance, system efficiency and reliability (Argyris and Schön, 1978; March, 1991; Simon, 1991).

Technological innovation and orientation prospect organization philosophy on how to apply and obtain new technologies and increase technological productivity and system efficiency (Gatignon and Xuereb, 1997). Technological innovation enhance technological capability to create superior performance for the organization and increase competitive advantage (Hakala and Kohtamaki, 2011). According to the concept to technology push, environmental characteristic such as dynamism can enhance technology reliability and productivity for the organization (Zhou and Li, 2007). Organization comfort, resources and dynamism enhance technological innovation and orientation to improve firm capabilities (Prahalad and Hamel, 1994; Hamel and Prahalad, 1994 Gatignon and Xuereb, 1997). Organizational structure contingencies and resources are among the main factors to determine Innovation and technological adoption to create necessary capabilities to improve performance (Perrow, 1972; Withey, Daft and Cooper, 1983). Organization structural contingency is defined by task-related technologies rather than tools and machinery (Perrow, 1972). To produce superior system performance, combination of organizational resource-based and technologies are required (Eldridge and Crombie, 1974). Organization structural variables include coordination mechanism, physical and emotional comfort and safety for employees, dynamic and tech integrated environment (Thompson, 1967). According to Jelinek (1977) organizational design and contingency influence technologies, system technical efficiency and mechanism. Woodward (1958, 1965) studied manufacturing firms with different management structure. Wood focused on organizational structure, technological mechanism and hierarchical levels. She confirmed the variation in organization structural and sources available to them define technological implementation, efficiency and reliability in the organization.

Teece and Pisano in 1994 developed dynamic capability theory. This theory explains how firms achieve and sustain competitiveness based on the processes that take place in a firm to match the dynamic, volatile environment. The approach emphasizes the capacity of a firm to renew competence as well as to integrate and reconfigure resources to match and create changes in the organization through innovation and technological adoption (Teece & Pisano, 1997; Eisenhardt &Martin, 2000). This theory informed the study of the relevance of a firm's dynamic capabilities that are crucial in achieving competitiveness in a dynamic volatile environment which led to technological changes through innovation.

In recent years, with creative measures such as patents being easier to access, empirical organizational improvement has assessed the effect of rates and environmental policies on economic development. Each of these study streams is discussed below.

Furthermore, Chen, Tang, and Feldmann (2015) studied the Chinese patent applications in the eight financial areas of the People's Republic of China for 1999–2004. The assessments were categorized according to kinds of organizations, subject regions, collaboration, and the allocation of technology. Their research also explores the connection between Gross domestic product (GDP), research and development, and Chinese patent applications in distinct areas and organizations.

Bryson (1995) argued that, in stakeholder theory, organization objective plays an important role in stakeholders' diversity of interest. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. The balanced scorecard model suggests dynamic environment support valued-added strategies and measurement greatly influence organization value outcome through technological changes and innovation toward firm performance. In a dynamic environment, stakeholders have power and influence over the kinds of technologies firms adopt to increase organization performance as stakeholders are affected by the firm's outcome in terms of growth and profitability (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999).

Hueske, Endrikat, & Guenther (2015) investigated that a large trade deficit has lowered U.S. welfare by raising unemployment and reducing salaries. The rise in average labor compensation (measured to include advantages) was not triggered by a significant increase in high-skilled workers' revenue and a mild decrease in low-skilled workers' revenue. Compensation levels for blue-collar employees also grew in the 1991–2006 era. The continued rise in Africa labor income in 1991–2006 may seem surprising because the post-1990 integration of the Soviet bloc, India, and China into the international division of labor has doubled the number of workers in the world economy. However, rapid globalization wasn't the only significant economic development in this era; accelerated technological innovations were perhaps even more important in their financial impacts. The latter growth generated substantial productivity gains that allowed African labor revenue to increase despite enhanced import competition, ongoing relocation of manufacturing equipment to foreign nations, and enhanced immigration to Africa. The rapid pace of globalization and the speed of technological development is a turnover in Africa employment. Also, Coad, Segarra & Teruel (2016) examined the impacts of globalization on technological change by concentrating on the determinants of technological change direction at the company environment levels. Findings reveal that small companies are more likely to implement capital-intensive technological changes as major companies introduce skilled technological changes.

Moreover, Bergek etl. (2015) studied the short-term effect of the airline sectors and economic markets. Having found that although the global economy has recovered and adapted to fresh worldwide realities, the longer-term effect of increased security risks across the globe can be seen in greater risk prices on asset markets and a change of resources towards a safety approach. The current issues on safety in an organization affect the pace and path of technological developments, given that attempts focus on creating techniques to increase environmental safety. Other researches with the main focus for effect on present challenges for safety, the allocation of resources to research and development, and the path of future research and development path lead to corporate growth.

Table 2.14. Relationship between Organization Environment and Technological Innovation

Authors	**Findings**
Bergek et al., (2015)	Studied the link between organization safety and technological development
Chen,Tang and Feldmann (2015)	Studied globalization and its relation between organization and technological innovation
Coad, Segarra & Teruel (2016)	Examined the impacts of globalization on technological change by concentrating on the determinants of technological change direction at the company level.
Abdul Basit & Medase (2019)	Studied the relationship between environmental policies, technological innovation, creativity, product success

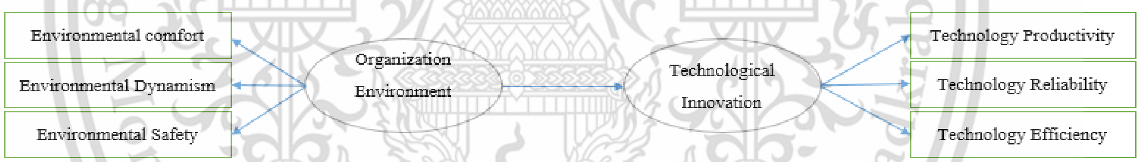

Figure 2.5 The linkage between Organization environment and Technological Innovation

Having reviewed the above, the following hypothesis is provided:

Hypothesis 3. Organization Environment Affects Technological Innovation of East African Gold Mining Companies.

2.8.4 Relationship between Social Factor and Technological Innovation

Hall et al. (2011) have since expanded a framework to address legitimization processes through operator proficiency, training needs, and social attitudes in its latecomer and worldwide value chain to understand the influence of cultural consequences of technology in emerging economies (Hall 2011). Moreover, cultural uncertainties may function as 'electricity' to innovation, in the sense that it justified its legitimacy toward increasing investment in technological advances (Abdul Basit, & Medase,2019).

In addition, the connection examined throughout the studies also demonstrates that cultural variables, training needs, and employees' attitudes in many cases, lead to influencing the organization's performance through technological innovation (Tigabu, Berkhout, & van Beukering, 2015). Adam (1994) mentioned firm performance as intensely dependent on the employees' performance quality which can be gained through training and employees' skills and technologies available to them. According to Teece et al (1997) firm dynamic capabilities and the resources that are controlled by an organization are classified as internal resources as well as other resources that firm obtain outside of the firm which include, alliances and partnerships.

Firm capability is its capacity to adopt to the changing environment (Amit and Schoemaker, 1993). Various researchers have reviewed and established relationship between social factor such training need and employee's proficiency toward technological innovation consisting technology reliability, productivity and system efficiency through the context of dynamic capabilities theory (Eisenhardt and Martin, 2000; ZolloandWinter,2002; Teece,2007; Helfat et al., 2007; Makkonen et al., 2014; Cohen and Olsen, 2015; Yarahmadiet al., 2015). The mediating variable of technological innovation is adopted from research of Valdez-Juárez, & Castillo-Vergara (2020) in technological innovation and capabilities, open innovation, dynamic capabilities to increase corporate performance which is based on original research of (Teece and Pisano1994; Teece, 2007) on dynamic capability theory. According to Protogerou et al. (2012) training need and employee's proficiency are dynamic capabilities that are principal means on adopting technologies toward strategic renewal. The quality of firm's internal operations rely on its dynamic capabilities, efficiency and integrations. Training and capabilities minimize errors in firm and enable firm to adopt new technologies and knowledge as well as developing new products to increase its overall efficiency (Yalcinkayaetal.,2007; Lubatkinet al. 2006; Yarahmadi et al., 2015). There is a strong relationship between employee's proficiency, expertise toward adopting new technologies to increase firm performance (Mody, 1993). According to Lin and Wu (2014) a firm can achieve internal learning "through training, knowledge database maintenance and knowledge sharing program". The researchers also suggested that employee's expertise and training are essential to effectively use technologies and knowledge sharing within the organization. Xu, Shang, Yu and Liu (2019) studied Intellectual Capital relation with mediating factor of technological innovation toward firm performance in China's Manufacturing Sector. They discovered employee's proficiency as human capital and organizational structure through mediating factor of technological innovation enhance productivity and operational efficiency which significantly influence firm performance with financial metrics such as growth.

Several researchers characterize employee's proficiency and training need vital to create dynamic capabilities and enhance technological development within an organization (Nelson and Winter, 1982; Teece et al., 1997; Zollo and Winter, 1999). Employees learning abilities to cope with new technological changes enhance how technology reliability, efficiency and innovation can be used to increase firm capabilities and performance (Argote, 1999). As learning mechanism guide the evolution of dynamic capabilities toward technological innovation within a firm (Zollo and Singh's 1998). Repeated practices enhance capabilities evolution as more experience improve technological proficiency and building a routine (Argote, 1999; Zander and Kogut, 1995). Experience along with repeated practice increase employees proficiency and training need which increase firm technological capabilities and sensitivity to error and failure (Dyer and Singh 1999;Sitkin, 1992;Hayward 2000).

The theory of dynamic capability explains how firms achieve and sustain competitiveness based on the processes that take place in a firm to match the employees training and efficiency toward technological innovation dynamism, the importance of the theory was required by the shortcoming of the resource-based and action-based theories in addressing dynamic economies. The Dynamic capability paradigm embraces entrepreneurship, innovation, organizational learning, and knowledge and change management (Teece, 2010). According to Zhou et al. (2005), there are three important type of strategic orientation which include technological innovation, market and entrepreneurial orientation. Several researchers focused on technological orientation and capabilities in creating solid foundation for businesses (Bhuian et a.l2005; Hakala and Kohtamaki 2011; Jantunen et al 2005). The concept of human capital relation to technological capabilities and orientation in entrepreneurship have been investigated by several researchers (Salavou, 2005 Zhou et al., 2005;Zhou and Li, 2007;Yarahmadi et al., 2015; Gatignon and Xuereb, 1997). The philosophy of technological capability orientation reflect a technological push which enhance products and services and differentiate them in market in comparison to competitors and considered as superior technological orientation which firm success depends on it (Zhou and Li, 2007; Gatignonand Xuereb, 1997; Zhou et al., 2005; Voss and Voss, 2000).

Employee efficiency can be enhanced through learning and training, R&D, processes, and adopting technological changes it leads to increased performance in the organization and associations with other players that include stakeholders, public and research institutes, and industry associations. According to the theory of dynamic capability, possession of dynamic capabilities also signifies a firm's capability to solve market problems through new technology and innovation to achieve the company's objectives in the form of a competitive advantage which can be achieved through skilled employees and efficient work force to be able to adopt to new technologies (Teece, et al.,2007). The approach emphasizes the capacity of a firm to renew competence as well as to integrate and reconfigure resources to match and create dynamic change through innovation (Teece & Pisano, 1997; Eisenhardt &Martin, 2000).

According to Ruoslahti (2018) social technology refers to innovative activities and facilities to address social requirements to achieve a company's objectives. It is also suggested that employees' development through training in information technology leads to improving the departments and therefore organization as a whole (Foxon, 2014).

The question is: Which one motivates the other, or does there effectively occur a relation between cause and impact? Specific methods can occasionally contribute to personal developments, while innovation can sometimes contribute to social technologies being implemented, as Abdul Basit & Medase (2019) proposed.

Stakeholder theory has attracted considerable attention from politicians and managers. According to Freeman (1984) stakeholders, company objectives based on management-specific proposed strategies need to fulfill stakeholder interest. To fulfill stakeholders' interests, employees' proficiency and training need toward using and implementing new technologies, knowledge management. To understand the concept of stakeholders, it is essential to understand what it stands for which is "an interest or share in an undertaking" (Carroll and Buchholtz, 2011).

Ruoslahti (2018) mentioned that social innovation is often more important in affecting patterns or prioritizing opportunities that lead to technological innovation. As social innovation in literature is a quite new term, no consensus on operationalization and the assessments of the social innovation structure has yet been reached. However, it is used to understand and create a continuous social change in a broad context (Tigabu, Berkhout, & van Beukering, 2015).

Pietromonaco, Uchino, & Dunkel Schetter (2013) argue a continuum of social development as two ends. Social and technological developments are separate concepts, which supplement each other in the organizational framework. Pietromonaco et al. (2013) defined the second end of the spectrum as an increase in fresh thinking about social organizations or social relations that could create new social institutions or create new social movements. According to Pietromonaco, Uchino, & Dunkel Schetter (2013), social entrepreneurship is referred to as innovative activities and facilities motivated by fulfilling the need for community. To satisfy the current social needs in the context of current social conditions, cultural development, the social relations model is arguably among the most critical framework in understanding the social context (Saleem, 2015).

Furthermore, social innovation refers to the novel solution which is among the most effective solutions to social problems where the value created is mainly attributed to society in its totality and not to individuals (Abdul Basit & Medase, 2019).

Gabarro (2014) argued that social inventions often represent important indices in modeling or selecting opportunities related to engineering technological developments. Social innovation allows technological development to grow and helps to understand a community's framework. However, technological innovations cannot improve an economy and the living conditions of a business without social, personal, and organizational growth. The technology could be hard to produce or implement in the current social context. Technological changes may not be viable unless a social structure is established. Social and technological options are therefore contributing to one another. Although many researchers argue that technological innovation has no direct link to social and cultural changes (Ting Toomey, 2015). Busch, & Hoffmann (2011) in the Institute of Advanced Science and Technology (AST), discussed the link between scientific technology and social technology. The topic was: (a) technological elements of sustainability; (b) social growth in sustainable development; (c) cultural technology; and (d) technological processes to promote their own. Psychic technology is considered as a scientific object in technology, biological engineering is used for medical products, and physical technology is used for agricultural products

Johnson, Gardell & Johannson (2020) then discussed the importance of social computing, integrating in various components. Ruoslahti (2018) mentioned various essential elements for distributing technology, offering innovation, communication channels, time, and the social system.

However, fresh indices need to evaluate the relations between the stream of data and knowledge, as well as the effect of the relationship between science and technology, and to understand how the socio-spatial and socio-institutional aspects of data and knowledge construct are depicted.

Patent metric techniques evaluate the characteristics and use of patent documents as an instrument and promote the identification and emotional and social relationships of information within the continuous integration system. Thus, we point to a fundamental and yet tenuous cognitive and socio-political validity. This approach is consistent with calls for innovation to be co-created with companies to expand their partnership in various levels to benefit and maximize the potentials.

Gabarro (2014) focusses the literature on the cultural consequences of development, and Ting Toomey (2015) mentioned the idea of cognitive and social attitudes validity on socio-technical structures, which based on these concepts, enhance in assessments to increase the researcher's understanding of bottom of pyramid (BOP) development dynamics toward the advancement of technologies to increase organization development. Furthermore, other enterprises such as non-profit organizations concurrently create status, including improving the quality of life for the poor from socially, ecologically, and economically aspects. This is consistent with the recent bottom of pyramid (BOP) study, including the development of local supply chains and clusters.

Theodorakopoulos et al. (2012) suggested that universities in emerging countries could efficiently transfer training needs between universities and rural industries. Furthermore, the operator proficiency of the value chain in a local cluster, along with misaligned strategy methods, precludes the distribution of bottom of pyramid (BOP) innovation. Authors have provided valuable insights into evaluating and disseminating innovative practices with comprehensive cultural impacts (Aiyar & Venugopal 2019).

The development of these tools has brought about a great change to the communities' environments, collective thinking, and cultural norms. Various cultural norms have changed the dynamics of particular communities across the world. While social innovation could be viewed as growth potential, it is also the first stage in inventing some technical tools and, in return, it contributed to further advancement in society and enabled individuals to use those technological innovations.

In addition, Jia, Guo & Barnes (2017) pointed out that technological innovation enhances administrative need by converting a concept into a practical alternative and social innovation can be regarded as applying those options in people's regular lives. Therefore, new products always need social developments to ensure the use of products and groups indicates the potential needs of technological innovation and new opportunities. Chen, Wu, Chang, Lin, Kung, Weng & Lee (2015) mentioned that new information and technology have turned social entrepreneurship into a strategy for local, regional and global applicability. Higher innovation levels lead to improved mental health, capital, personal capital, economic growth, and better quality of life and cultural involvement.

Aga, Noorderhaven, & Vallejo (2016) analyzed how science, technology, and social studies are institutionalized and the relation between innovation and social context in organizations' development. Jia,Guo & Barnes (2017) studied extending the information system continuance model based on the technology and organization environment framework and their interaction to influence the enterprise's culture and the employee's attitude. Innovation in the interactive procedures between technology, employee training, and organization environment. Ruoslahti (2018) examines innovation procedures within social contexts, the power of creativity, and innovation from the public and private sector and individuals toward influencing innovation and information technology systems. These instances show how emergency and disaster management technologies can also be created under social situations, using common 'open innovation' frameworks in the private and public sectors.

Wadhwa, McCormick & Musteen (2017) claimed that together with technological expertise gathered in the consumer electronics sector, creative resources fostered by popular cartoons and animation have enabled a prosperous video game industry in Japan. The knowledge and creative foundations affecting this industries' evolutionary path, with the connections to consumer electronics and the cartoons and animation sector, then be evaluated along with the industry's growth from its origins to platform developers and software publishers.

Coccia (2017) focused on constructing and maintaining informal innovation networks consisting of mining businesses within the incubators, and industry, based on field research at a technology incubators. A linear model of emerging technology growth is laid aside, and a cyclical model based on social networks is proposed. A broad range of exchange interactions are provided and discussed (official and informal), ranging from the use of library and laboratory facilities to the continuing exchange of information, know-how, and even shared practice.

Table 2.15 Relationship between Social Factor and Technological Innovation

Authors	Findings
Coccia (2017)	Argued that innovation can sometimes contribute to social technologies through social systems.
Jia, Guo & Barnes (2017)	Studied extending the information system continuance model based on the technology and social innovation framework and their interaction toward influencing the enterprise.
Wadhwa, McCormick, & Musteen (2017)	Mentioned Technological innovation satisfies a human requirement by converting a concept into social innovation.
Ruoslahti (2018)	Studied various essential elements for distributing technology, offering innovation, communication channels, time, and the social system.

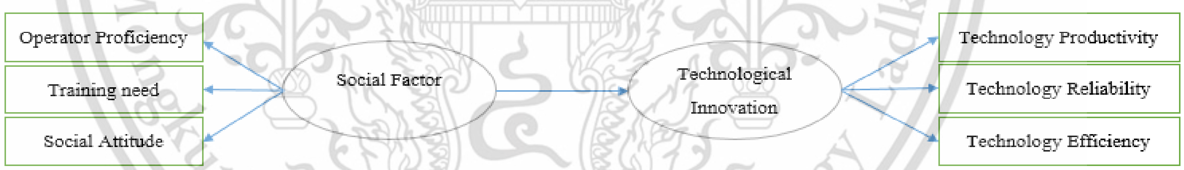

Figure 2.6 The linkage between Social Factor and Technological Innovation

Having reviewed the above, the following hypothesis is provided:

Hypothesis 4. Social Factor Affect Technological Innovation of East African Gold Mining Companies.

2.8.5 Relationship between Social Factor and Control System

The foregoing studies stressed the importance of human relations, leadership, encouragement, and the culture of the enterprise as less formalized but equally significant, especially their relations toward control systems within a company. As a result, today's organization’s management regulation is not viewed as a closed mechanism but rather as a structure that has social implications and is open to the dynamics of the participants and their environment (Hajli, 2014). Considering all this, the various theories and methods on the administrative management approach toward control system developed, synthesized into the company's goals and objectives. Therefore, the concept of organizational control appears to be correlated with various social aspects of employees involved in the operation Several researchers discussed and established the relation between social factor as of employees proficiency, training need and social attitude relation to control system which contain capabilities, operating compliance and information system based on the dynamic capability theory (O'Reilly and Tushman, 2008; Teece and Pisano 1994; Teece,2007; Helfat et al., 2007; Makkonen et al., 2014; Cohen and Olsen, 2015; Wright and Snell, 2009).

Employees' skills, training need, their norms, and corporate culture, and decision rules that can be employed by firms to create and capture value. The capabilities may stem from change routines, control loop development, and innovative managerial capabilities. They enable the firm to align their distinctive resources/competencies which include employees' proficiency to affect operational procedure and internal control system which eventually lead to increased performance within the organization. Capabilities are critical to the long-term profitability of firms (Teece, 2007). Employees' proficiency has the potential to increase firm competitive advantages (Wright and Snell, 2009). Firms through utilizing human capital, employees training need and proficiency create capabilities necessary to enhance control procedures to minimize error and increase competitive advantage (Zollo and Winter, 2002; Winter, 2003). According to O'Reilly and Tushman (2008) stress in their theoretical research paper the importance of training need and employees learning abilities to create dynamic capabilities for firm and enhance control system.

Organization capabilities depends on proper training and procedures to use technologies and information system to enhance firm control system management (Goh, 2003). Training need facilitate organizational learning process and capabilities to maximize system efficiency and improve firm performance (Jerez-Gomez et al. 2005). Employee's proficiency through control loops enhance organizational capabilities and innovation (Goh 2003; Schendel 1996). According to Alegre and Chiva (2008), found that employee's proficiency and capabilities positively influence firm control system. Firm competitive advantage is significantly influenced by its human capital and capabilities (Haanaes

2016; Schildt et al. 2005; Vanhaverbeke et al. 2004), therefore researchers focus on the importance of relation between employee's attitudes, proficiency toward enhancing firm control system and dynamic capabilities (Atuahene-Gima and Murray 2007; Schildt et al. 2005; Eisenhardt and Martin 2000; Porter 1990; Teece et al. 1997; Zollo and Winter 2002). Other researchers recognize training need as the main tool to develop organization capabilities and a key factor in firm competitiveness through identifying, gaining and reestablishing knowledge and proficiency (Li et al. 2008; Ohr and Mattes 2013; O'Reilly and Tushman 2008; Raisch et al. 2009; Teece et al. 1997). Some researchers have suggested that practices enabling training and knowledge management are principally vital to innovation and capabilities within an organization (Kogut and Zander 1992; Teece and Pisano 1994). Other researchers have studied how firm collaboration with other firms enhances through their control loops and necessary training (Lichtenthaler, 2009; Mishra and Shah, 2009).

On the one hand, it is considerably less exact to compare particular activities at these levels with the overall goals of the organization, and on the other hand, the individuals responsible sometimes be compelled to behave for the sake of the entire organization. Furthermore, incorporating socio-cultural factors in the organization and distinguishing between two kinds of controls, which rely on individual participation, distinguishing between external control and internal control. External control is less susceptible than internal control to socio-cultural factors, while internal control is based upon the involvement and the association of the individual with an organization. Camisón and Villar-López (2014) distinguish two points of view. First, a limited perspective on the control concept can be understood as an analysis of the management effectiveness posterior and in monetary terms by the individual in charge of the company, to the expected results or predetermined objectives (Cresswell & Sheikh, 2013).

Care in this context (people, culture, environment) is rationally developed, isolated by comparing the results achieved between various stakeholders. The control systems are used most commonly within this restricted approach. Secondly, a more comprehensive control prospect that takes account of financial aspects and (and in particular) of the context in which activities take place, especially aspects relating to the behavior of individuals and organizational culture.

Stakeholder theory focuses on how individuals and groups affect the organization as employees' proficiency and training influence how organization sync with its system to achieve superior performance (Freeman,1984). Stakeholders affect organization outcomes by their interaction, management decision-making toward the firm's organization performance. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. Stakeholders by their proficiency and capabilities influence firm internal control procedures which affect firm's outcome in terms of growth. Stakeholders have power and influence over the kinds of technologies firms adopt to increase organization performance as stakeholders are affected by the firm's outcome in terms of growth and profitability (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999). According to the balanced scorecard model (BSC), a firm needs to have value-added strategies which include stakeholders' interests to achieve organization objectives.

The management and the individual members of the organization exercise control of this second perspective (De Massis, Frattini, & Lichtenthaler, 2013). It is practiced posterior and constantly updated and must be limited to the technical aspects of its design and adapted to organizational culture and its employees. It needs to be flexible regarding the control process as a motivational tool and not rely on the outcome alone. Lamarche and Maillet (2016) mentioned a political perspective, regarding the definition of control which is linked to the concepts of authority (the organizational leader must dominate his behavior), aims, and strategy toward the effort to achieve organizational goals through combining the effective and efficient means and resources of the organization toward its building a dynamic control system.

The control is just one of the essential elements of corporate management, but it is certainly only one of the elements that the organization can use as an administrative system, even if it contributes to the improvement of organizational administration the most (Saleem, 2015). Measuring this performance means at the same time translating the strategy of the organization through social programs and training leads to building a more efficient control system which enables the organization to sync with its internal system, thus enabling the organization to understand its path (Atalay, Anafarta, & Sarvan, 2013).Furthermore training and knowledge management are principally vital to innovation and capabilities within the organization (Kogut and Zander 1992).

Table 2.16 Relationship between Social Factor and Control System

Authors	**Findings**
Lamarche and Maillet (2016)	Mentioned organizational leader must dominate his subaltern's behavior), aims, and strategy (the effort to achieve set goals is made by combining the effective and efficient means and resources of the organization toward building a dynamic control system
Hajli (2014)	Reviewed organization's management regulation is not viewed as a closed mechanism but rather as a structure that has social implications and is open to the dynamics of the participants and their environment and internal control procedures.
Saleem (2015)	The control is just one of the essential elements of corporate management, but it is certainly only one of the elements that the organization can use as an administrative system,
Atalay, Anafarta, & Sarvan, (2013)	Studied the strategy of the organization through social programs and training leads to building a more efficient control system which enables the organization to sync with its internal system

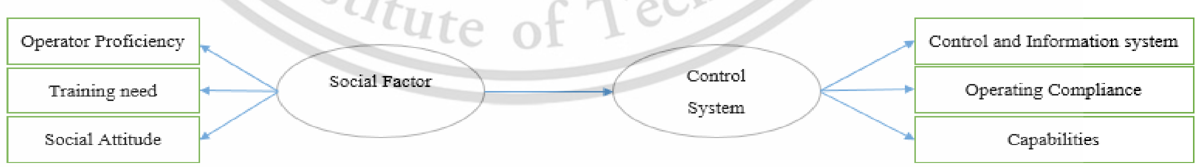

Figure 2.7 The linkage between Social Factor and Control system

Having reviewed the above, the following hypothesis is provided:

Hypothesis 5. Social Factor Affects Control System of East African Gold Mining Companies.

2.8.6 Relationship between Technological Innovation and Control System

Fan and Xie (2020) discuss global innovation problems in multinational companies by examining communication and control patterns in international research and development activities. Three kinds of research and development (R&D) unit roles (local adaptor, global adapter, global creator) using a sample of 110 global R&D units from 15 multinationals. They demonstrate that: (1) each sort of R&D unit mainly has to be operated in a distinct form of control; (2) local and global adapters have both focused their interaction on their internal corporate network.

Cooper (2018) explored manufacturing, industrial design, and the inclusion of some or all these aspects on Firm performance. In turn, each approach led to commonly known procedures: manufacturing design, agile business, simultaneous engineering, value engineering, assembly design, product data management; the product life cycle can be achieved through an efficient control system. They focused thorough integration into control system structures of new (or redesigned) components or products used in the operation and control of production and product assembly. They offered an innovative mechanism to enhance the ‘controllability' concept that makes it easier to develop and maintain efficient control systems within an organization.

Goodale, Kuratko, Hornsby, & Covin (2011) have acknowledged the link between the product market and technological innovation and the company control system toward succeeding the company's objectives. The two phenomena of business entrepreneurship and operational control can be inherently contradictory on the surface. In other words, corporate enterprise wants to take the company in new directions, while business control aims to convey and often restrict behavior. It is helpful to understand how operational factors such as technical efficiency and technology productivity interact with the determinants of the enterprise business to encourage innovative results that promote long-term business success. Through examining 179 companies working for a multitude of sectors, this research looks at the impact on innovation performance on several commonly recognized corporate enterprise backgrounds, as measured through the Corporate Entrepreneurship Assessments Instrument (Wicki, & Hansen, 2017).

The mediating variable of technological innovation is adopted from research of Valdez-Juárez, & Castillo-Vergara (2020) in technological innovation and capabilities, open innovation, dynamic capabilities to increase corporate performance which is based on original research of Teece and Pisano

(1994) and Teece, (2007) on dynamic capability theory and resource-based view. The researcher explores the relationship between technological innovation, information technology efficiency and control system of the organization and how innovation and technology influence internal control system efficiency and capabilities toward overall performance of the firm. According to Colin (1994) dynamic capabilities are simply capabilities that contribute to change management through innovation and control system robust to increase organization performance. Technological innovation variable includes IT productivity, efficiency and reliability and the degree of innovation influence management control and information system of the organization (Jones, 1985; Certo and Peter, 1993; Daft and Macintosh, 1978; Hitt etal., 2008; Catelli, 2001; Barney and Hesterly, 2007). Furthermore, to support this, Bissell and Keim (2008) proposed a model for conducting business diagnosis while having an organization system boosted by technology toward achieving organization objective which is another contribution factor on internal control process. According to the theory of dynamic capability, the capabilities are vital in a dynamic environment of rapid change, prevailing in the growth of industries through adopting technology adoption and efficient control procedures (Teece, 2007; Teece, 2009). Innovation is acknowledged as one of the critical firm capabilities to influence its internal control system that affects firm's sustained competitive advantage and superior performance (Albaladejo & Romjin, 2000). Innovation capability allows firms to use current resources to create new resources, products, processes, and systems as well as devise new ways of using new resources to gain a competitive advantage (Teece & Pisano, 1997). Possession of dynamic capabilities also signifies a firm's capability to solve market problems and to achieve a new and innovative form of competitive advantage and performance (Teece, et al, 2007).

The approach emphasizes the capacity of a firm to renew competence as well as to integrate and reconfigure resources to match and create market change through technological innovation and control system (Teece & Pisano, 1997; Eisenhardt &Martin, 2000). This theory informed the study of the relevance of a firm's dynamic capabilities that are crucial in achieving competitiveness in a dynamic volatile environment. Manufacturing enterprises operate in such environments and developing their dynamic capabilities that include innovation and control procedures are critical for firm's growth and profitability. The dynamic capability approach reflects a firm's ability to solve market problems and enhance firm sensitivity to failure in internal control procedures by implementing technologies and innovation to achieve competitiveness (Teece et.al, 1997). The dynamic capabilities provide a comprehensive framework in understanding how firms create value for growth and competitiveness in a dynamic environment.

Most importantly, the researchers examine the mediating impacts of factors on the relations between corporate entrepreneurship and innovation performance–precisely risk control and process control formality. Results show that the direct effects on innovation performance are moderately significant, with only two of the five corporate business antecedents. Each of the five precedents interacts considerably with one or two operation management factors and thus affects development productivity. The consequences of these outcomes are discussed in the theory and practice of operations management and entrepreneurship. Stakeholder theory has attracted considerable attention from politicians and managers. According to Freeman (1984) company objectives based on management-specific proposed strategies need to fulfill stakeholder interest. To fulfill stakeholders' interests which include firm superior financial performance. Innovation and implementing new technologies led to efficient management, operation, and control system which improved firm performance and competitiveness. To understand the concept of stakeholders, it is useful to understand what it stands for which is "an interest or share in an undertaking (Carroll and Buchholtz, 2011).

Yadav, Shinde, Junavane, and Mate (2018) pointed out that the dissemination of the innovating strategy as a cognitive system shift was confined to a study of ways in which fresh information technology could be implemented successfully rather than of how "Innovation can enhance corporate control and technology efficiency" because it is essential to improve the company performance programs, as part of an innovation program for administrative processes.

Kyratsis Ahmad and Holmes (2012) focused on adopting innovative techniques in monitoring and control system and the result was used in the organizational decision-making process. Methods of design of various cases involving primary and acute care trusts at a high quality, multilevel level. They have carried out 121 interviews in a semi-structured manner based on a deliberate, multi-stakeholder sample. Their study contributed into better understanding the relations between technological innovation and control system.

An embedded method was used to analyze the data. They have precisely mapped the choices taken in the field of organizational implementation into different kinds of innovation concepts which include: consciousness (the awareness that innovation exists), values (its technology reliability). This asymmetric approach to the distinct types of information was shaped by main stakeholders and decision makers in the organization. In conclusion, innovation in the business industry is on individual levels, technology reliability, and most focus by exchange organizations is on understanding and sensitivity. The researcher discovered the opposite, with less emphasis on developing knowledge at the time of innovation decision making and more attention being paid by decision-makers and change agents to values of understanding. Taking part in the decision-making process can improve the successful implementation of technologies and their technology efficiency. Information systems provide new potential for control systems due to the possibility of data accuracy and share ability and reducing the time action at a distance (Lu, Shang, Li, Wu, & Zhang, 2018).

Jayaraman, Yeoh, Zhang, & Poh (2018) focus on mining multinational company (MNC) control systems used to administer their foreign research and development (R&D) units. Based on the literary work on the theory of corporate authority and contingency, the research creates and tests empirically several assumptions to explain how their headquarters manage their R&D units abroad. Hypotheses can be tested by data gathered from 134 German MNC for R&D units. The results show that the R&D mandate and interdependence of the units are essential in explaining control processes. In comparison with contingency approaches, they offer a comparatively weak predictive strength of political strategies.

Trostmann (2019) investigated the business-to-business company services analyzes in a theoretical context on property rights' determinants and impacts of intellectual asset control rights. Regression analyzes based on survey information indicate that service providers with more creative control of their intellectual performance. In long-term relations, the need for service companies to regulate the outsourced operations and the incentives provided by providers to invest in an efficient control system and technology reliability can thus be better balanced (Yadav, Shinde, Junavane, & Mate, 2018). In addition, the negotiating power of service providers and their indispensability for service projects are strongly linked with their capacity to maintain control privileges, which is consistent with theoretical projections regarding the right to ownership. By comparison, the distribution of control rights between service providers and their customers does not involve much technology productivity (Kyratsis Ahmad, & Holmesfocus, 2012).

Technological breakthrough refers to the process of new knowledge exploration through analytical approaches by research institutes, universities, and other scientific research institutions. A strong technological breakthrough provide capabilities to develop products with superior performance, which then improve the product technology level in the market.

Firm capabilities to renew competence as well as to integrate and reconfigure resources to match and create market change through technological innovation and control system are vital to increase performance (Eisenhardt &Martin, 2000).

Table 2.17 Relationship between Technological Innovation and Control System

Authors	**Findings**
Cooper (2018)	Explored manufacturing, industrial design, and the inclusion of some or all these aspects affect Firm performance. They focused on the thorough integration of new (or redesigned) components/products into control system structures.
Lu, Shang, Li, Wu, & Zhang (2018)	Argued information systems provide new potential for control systems due to the possibility of data accuracy and sharability and reducing the time action at a distance.
Fan and Xie (2020)	Discussed global innovation problems in multinational companies by examining communication and control patterns in international research and development activities.
Yadav, Shinde, Junavane, & Mate (2018)	Pointed out that the dissemination of the innovating strategy as a cognitive system shift was confined to a study of ways in which new information technology could be implemented successfully rather than of how "Innovation can enhance

Table 2.17 Relationship between Technological Innovation and Control System (Continue)

Authors	Findings
	corporate control and technology efficiency" because it is essential to improve the company performance programs, as part of an innovation program for administrative processes.

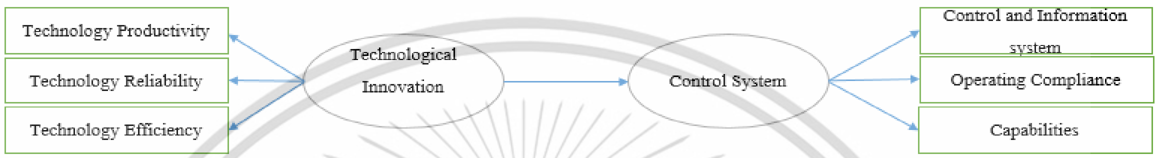

Figure 2.8 The linkage between Technological Innovation and Control System

Having reviewed the above, the following hypothesis is provided:

Hypothesis 6. Technological Innovation Affects control system of East African Gold Mining Companies.

2.8.7 Technological Innovation Relationship with Firm Performance

Bin Zainuddin (2017) presented a conceptual model based on the resources-based perspective and contingency theory to further comprehend the moderating role of environmental turbulence in the company (TIC) in Malaysia's company results in the automobile industry through technological implementation and innovation. His research then became concrete hypotheses for research into future studies. The conceptual model will guide further studies in the field, which is supposed to contribute to the growth of the Malaysian car industry.

Chen, Tang, and Feldmann (2015) studied the impact of intercompany technological cooperation on product development, and company performance is examined using information from a sample of 133 Chinese high-tech Multinational companies (MNCs). The framework builds on the evolving strategic concepts of leadership, including resource-based vision, knowledge, and the company's vision of vibrant capacity. Results are concluded: corporate size, coupled with cooperation, has a considerable effect on the creation of patents; the pace of cooperation success increases with the increase in the number of cooperating projects; more cooperative companies engage in relationships; successful companies enhance sales to increase profitability (cooper 2018).

The mediating variable of technological innovation is adopted from research of Valdez-Juárez, & Castillo-Vergara (2020) in technological innovation and capabilities, open innovation, dynamic capabilities to increase corporate performance which is based on original research of Teece and Pisano (1994) on dynamic capability theory and resource-based view. Helfat & Peteraf (2003) and Teece & Leih, (2016) also explored and concluded technological innovation relation significantly influence firm performance through context of dynamic capabilities. Technological innovation develop capabilities to enhance firm performance financially (Wang 2020).

Adopting new technologies and implementation are essential for firm to chive its objectives (Tornatzky and Fleischer, 1990; Ireland and Webb, 2007). Technological innovation increase firm capabilities and enhance its competitive advantage toward improving firm overall performance (Erickson et al., 1996; Ireland and Web 2007; Barney, 2005; Hitt and Brynjolfsson, 1996; Tornatzky, and Fleischer, 1990). According to Gatignon and Xuereb (1997), a technology oriented firm is referred to a firm with capabilities that acquire and implement technology and innovation to develop new products and generate financial growth. Firms require to have certain technological proficiency to deal with highly competitive corporate environment (Workman, 1993). Firm performance depends on its information and technology productivity and reliability (Denrell et al. 2003 and Karami 2012). Technological development lead firms to increase competitive advantage through innovation and creating capabilities (Aragón-Sánchez and Sanchez Marin, 2005). According to Hurley and Hult (1998) firms encourage innovation, new ideas and implement new technologies to create capabilities to be able to develop new products and services to generate revenue. High-tech organizations through, creativity and invention generate capabilities as the main organizational actions and philosophies which direct its value added strategies and innovation (Li, 2005; Zhou et al., 2005). Researchers such as Cooper (1994) and Song and Parry (1997) argued the importance of firm technological capabilities to develop new products and services. Furthermore Hamel and Prahalad (1994) mentioned firms with technological capabilities through efficient leadership can differentiate its products and improve firm performance. Technological innovation direct firms to have capabilities to develop advance products and services in comparison with competitors in the market and to achieve superior performance and market value

(Gatignon and Xuereb 1997; Voss and Voss 2000). Firms to cope with highly competitive environment, it is essential to allocate resources and develop capabilities through innovation and technology to manage uncertainty and reduce risk (Srinivasan et al., 2002).

According to Teece and Pisano (1994) dynamic capability theory refers to the ability of a firm to adjust to changes in the market through innovation is crucial for the competitiveness of firms. It is argued that the fundamental impulse that drives capitalism stems from the innovation of new products, new methods of production, new markets, and new forms of industrial organization (Schumpeter, 1942).

Dynamic capabilities refer to a "firm's capability that allows it to develop new products and processes in response to dynamic market situations" (Teece & Pisano, 1997). Organization competitive advantages required by elements in dynamics capabilities (Teece & Leih, 2016). Firm dynamic capacity is based on the expansion of resource based-perspective to observe how capabilities influence management procedures and technological changes to increase performance in an organization (Birkinshaw, Zimmermann, & Raisch, 2016). There are various views which support information technology, innovation and dynamic capabilities toward improving firm performance and to create competitive advantage (Cavusgil & Knight, 2015; Camisón & Villar-Lopez, 2014; Chen & Miller, 2015; Rothaermel, 2015). Furthermore Rothaermel, (2015) also reviewed how dynamic capabilities crease value within an organization. According to Breznik & Lahovnik (2016), stated to develop dynamic capabilities, it acquires resources and technologies toward improving firm performance in small and medium enterprises.

Dynamic capabilities include skills, procedures, technological changes and innovation, organizational structures, and decision rules that can be employed by firms to create and capture value. The capabilities may stem from change routines, product development, and innovative managerial capabilities. They enable the firm to align its distinctive resources to the changing business environment. Dynamic capabilities through enhancing innovation and adopting technologies are critical to the long-term profitability of firms (Teece, 2007).

Shan & Jolly (2013) investigated a sample of 215 Chinese companies from the electronics industry was conducted for this research. It shows that the various technological innovation capabilities positively affect market value, product innovation, starting with the connectivity capacity, moving to production capability, and ending with investment. The study also demonstrates that product innovation impacts the connection between distinct technological and business performance capacities. Stakeholders, company objectives based on management-specific proposed strategies need to fulfill stakeholder's interest (Freeman, 1984). To fulfill stakeholders' interests which include firm superior performance. Through Innovation and toward using and implementing new technologies led to improving firm performance and competitive advantage can be achieved. To understand the concept of stakeholders, it is important to understand what it stands for which is "an interest or share in an undertaking" (Carroll and Buchholtz, 2011).

According to Lowe (2019), the company's response to the competition is to enhance organizational innovation by adopting new technologies that eventually lead to increased performance. Camisón & Villar-López (2014) mentioned innovation and information systems affect organizational performance through increasing profitability and market value. Houpis, Rasmussen, & Garcia-Sanz (2018) use quantitative analysis to show a significant and robust correlation between technological innovation and firm performance and conclude technological innovation enhance performance and better-performing organizations participate more actively in organizational growth. A substantial number of studies have shown that standard techniques, such as quality management systems and high-performance management approaches (Houpis, Rasmussen, & Garcia-Sanz, 2018) have positively impacted firm profitability.

Camisón, & Villar-López, (2014) examined the impact of partner technological diversity and alliance organizational form on the mining company's innovative performance. They discovered that alliance partnerships make a big difference when technological diversity is moderate rather than low or high, based on a sample of 463 R&D partnerships in the telecommunications device sector. While this connection does not concern the organization of the alliance the hierarchical organizations, such as an equity joint venture, enable firms to take advantage of partnerships to enhance firm technological diversity. Thus, alliance organization, which impacts efficiency, is likely to affect partner capacity and incentives to share information, therefore, improve the firm overall performance.

Table 2.18 Technological Innovation Relationship with Firm performance

Authors	Findings
Houpis, Rasmussen, & Garcia-Sanz (2018)	Studied quantitative analysis to show a significant and robust correlation between firm performance and technological innovation and conclude that better-performing organizations participate more actively in organizational growth through increasing technology diversity within the organization.
Bin Zainuddin (2017)	The moderating role of technological innovation in the company performance in Malaysia's company results in the automobile industry.
Chen, Tang & Feldmann (2015)	Studied the impact of intercompany technological cooperation on product development and firm performance by examining information from a sample of 133 Chinese high-tech Multinational companies (MNCs).
Lowe (2019)	The company's response to the competition is to enhance organizational innovation by adopting new technologies that eventually lead to increased performance.

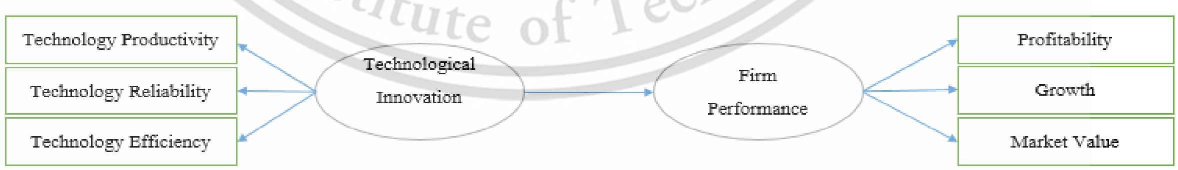

Figure 2.9 The linkage between Technological Innovation and Firm performance

Having reviewed the above, the following hypothesis is provided:

Hypothesis 7. Technological Innovation Affects Firm performance of East African Gold Mining Companies.

2.8.8 Relationship between Control system and Firm performance

Yan, Chong, & Mak (2010) studied a management discretion model which suggests that overall company performance depends on how autonomy, contractual control, and management compensation affect management discretion in International Joint Ventures (IJV). This study tests managers ' discretion. The writers recognize that the relation between the organizational level of engagement of IJV executives and the use of firm-specific skills tends to improve if executives have the required amount of discretion with the study Information System from 136 IJVs in China.

The results indicate that the connection between increased discretionary management and superior corporate performance is not statistically significant. The research adds to strategic capitalism management and leadership theory by favorably mediating the relation between this discretion and efficiency as IJV executives achieve more managerial control, job independence, and compensation.

The relationship of the monitoring system and operating approaches such as consistency (Shin, & Xu, 2017) to consumers has also been studied by researchers. Second, the research proves provisionally that a match is related to better performance between knowledge management strategy and human resource management and control systems. The findings demonstrate how the firm's knowledge management strategy fits human resource management and control systems toward improving firm performance with a new set of variable that researchers have supported from the structural contingency perspective. Results show that the human resource management and control systems model should be expanded to include operating compliance variables. Houpis, Rasmussen, & Garcia-Sanz (2018) studied the Relationship of the monitoring system and operating approaches such as consistency to consumers.

According to (Penrose, 1959) resource-based theory and capabilities support firm control loops to increases innovation and competitiveness and to use its own resources effectively to develop competitive advantages which lead to improved firm performance. The theory posits that a firm can gain a competitive advantage by having distinctive resources or capabilities through control loops and procedures to sync with an overall objective of the organization result in increasing firm performance. Control system a mediating variable in this study is developed from Aminu Ahmad, N., & Mohamed, R.2018; Villar, Lin & Wu, 2014) which reviewed resource-based theory and dynamic capabilities on control system relationship toward firm performance. The researchers stated how control procedures characteristic through available resources develop capabilities and enhance information and control system significantly and increase firm performance.

Various researchers have reviewed the impact of control system and its capabilities in improving the firm performance (Hermano & Martin-Cruz, 2016; Villar, Alegre & Pla-Barber, 2014). Dynamic capabilities enhance competitive advantages in firms by bringing functional proficiencies (Pervan, Curak, & PavicKramaric, 2017). According to Wilden & Gudergan (2015) dynamic changes enhance organization capability to construct consequences on firm performance. Internal control system in an organization based on management loops to enhance communication between departments and minimize error while increase efficiency toward achieving organization's objectives (Wang, Senarate & Rafiq, 2015). Furthermore Chen & Miller (2015) explored the relationship between control system capabilities toward firm performance empirically. Other researches support firm capabilities and resources (Widener 2007) and entrepreneurial orientations (Ripollés & Blesa 2005) are positively associated with performance.

According to Teece and Pisanoc (1994) the dynamic capability theory explains how firms achieve and sustain competitiveness based on the processes that take place in a firm to match the dynamic, volatile system of the organization. The dynamic capability and control procedures increase systematic control of the operation and internal system which embrace innovation change management and origination performance (Teece, 2010). Dynamic capabilities refer to a "firm's capability that allows it to develop new products and processes in response to dynamic market changes to serve the organization and stakeholders interest (Teece & Pisano, 1997).

A robust theory of dynamic capabilities evident of management control system contribute for the mass production and requires planning control decision on firm operational system (Kaplan, 1984). Furthermore Malmi & Granlund (2009) explored the relation between management control procedures and firm performance in accounting firm. Tobergte and Curtis (2013) investigated the impact of information system in internal control system and how it influence the organization operation. Macintosh & Scapens (1990), explored the resource-based view approach and how internal system capabilities enhance management control loops to identify and minimize errors and maximize performance (Macintosh & Scapens, 1990). Furthermore resource-based view at firm's resources as vital to achieve superior performance for organizations (Barney & Clark, 2007; Obinozie, 2016). Resources contain all assets that firm control and can enticement through value added strategies to create capabilities (Grant, 1991). According to Barney and Clark (2007) to enhance competitive advantage, organizations need to own valuable resources that are rare and expensive. Therefore several studies attempted to investigate how firms through efficient control loops could turn resources into capabilities to enhance performance (Barney & Clark, 2007; Fosfuri, Andrea, Gómez-mejía, 2007). Various literature including (Nothnagel, 2014), revealed that resources are vitally important to increase organization capabilities and performance.

The resources include tangible and intangible assets which include in firms daily routines and operations to increase capabilities (Barney & Clark, 2007; Grant, 1991; Nothnagel, 2014; Nura, 2014). The resource include physical structures such as capital, buildings, plants and equipment as well as intangible assets which include culture, organization characteristic, information and control capabilities, knowledge management, branding and value added strategies (Barney, 1986, 1991, 2007). The resource-based view literature highlight the importance of resources and firm control system to enhance performance (Nothnagel, 2014). Both tangible such as building, properties and equipment and intangible assets such as brand equity, corporate culture, intellectual property and information system capabilities as resources contribute through control loops to firm performance (Barney & Clark, 2007; Barney, 1986, 1991; Grant, 1991; Nothnagel, 2014; Nura, 2014).

Dynamic capabilities include skills, procedures, organizational structures, and decision rules that can be employed by firms to create and capture value. The capabilities may stem from change routines, product development, and innovative managerial capabilities. They enable the firm to align its distinctive resources/competencies to the changing business environment. Dynamic capabilities are critical to the long-term profitability of firms (Teece, 2007).

Shin, & Xu (2017) studied how information system applications are associated with the strategy, the scope of 12 planning, and control features that affect company performance significantly. In addition, information from publicly reported economic reports, we analyzed survey information acquired from 296 Taiwanese firms. Results showed that strategy has a significant impact on the scope of planning and control information system applications. In turn, the magnitude of information technology apps had a considerable direct impact on company performance, while it had an insignificant direct impact on strategy. Information technology enhanced the connection between the control system and the magnitude of the application (Vuong etl, 2017). The results go beyond these general relations to show systemic alterations in particular information system apps, operating compliance, firm-level innovation, capabilities, and obstacles for companies that pursue strategies to boost their performance (Abdul Basit & Medase, 2019). An efficient control system influence and improve firm performance by evaluating the output of the system for its consistency with pre-defined sets of parameters (Agyemang & Broadbent, 2015).

According to Freeman, (1984) stakeholders, company objectives based on management-specific proposed strategies need to fulfill stakeholder interest. To fulfill stakeholders' interests which include firm superior performance. According to Post, Preston, & Sachs (2002) emphasize that the capacity of a company to generate sustainable wealth in the long-term, is determined by its relationships with critical stakeholders in various departments, particularly in key areas such as decision making, control procedures, and implementing new policies and any stakeholder relationship may be the most critical one at a particular time or on a particular issue which include an efficient control system, operation, and control loops and implementing new technologies led to efficient management, minimizing operational error and maximize performance and competitiveness and superior performance. To understand the concept of stakeholders, it is useful to understand what it stands for which is "an interest or share in an undertaking" (Carroll and Buchholtz, 2011).

Guiffrida, Datta, Dey, LaGuardia, & Srinivasan (2011) this research examines the link between the control system and corporate performance by considering the impact of control-ship, control of corporate size. The research revealed that company ownership was favorably related to company performance with proxy information from 786 government family companies in Taiwan during 2002–2007. Enhancing technologies boost up company performance. The results indicate that if ownership is active in leadership and control management, the company performance increase. Furthermore, in multinational companies, the relationship between ownership and company performance is more significant than in small and medium enterprises.

Table 2.19 Relationship between control system and Firm performance

Authors	**Findings**
Agyemang & Broadbent (2015)	Studied quantitative analysis to show a significant and robust correlation between firm performance and technological innovation and conclude that better-performing organizations participate more actively in organizational growth through increasing technology diversity within the organization.
Shin & Xu (2017)	The moderating the importance of control system in the company performance in Malaysia's company results in the automobile industry.
Guiffrida, Datta, Dey, LaGuardia, & Srinivasan (2011)	Studied the impact of intercompany technological cooperation on product development and firm performance by examining information from a sample of 133 Chinese high-tech Multinational companies (MNCs).
Houpis, Rasmussen, & Garcia-Sanz (2018)	The company's response to the competition is to enhance organizational innovation by adopting new technologies that eventually lead to increased performance.
Abdul Basit, & Medase (2019)	Investigate systemic alterations in particular information system apps, operating compliance, firm-level innovation, capabilities, and obstacles for companies that pursue various strategies.

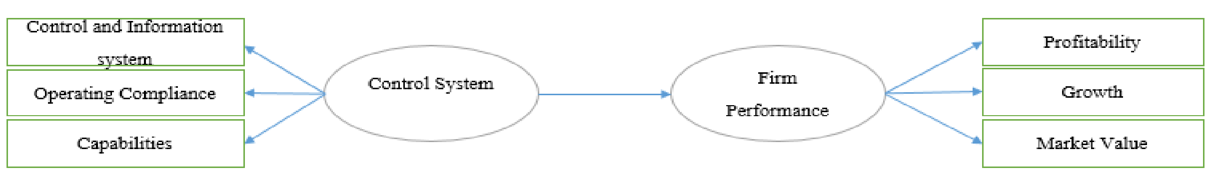

Figure 2.10 The linkage between control system and firm performance

Having reviewed the above, the following hypothesis is provided:

Hypothesis 8. Control system Affects Firm performance of East African Gold Mining Companies.

2.9 Conceptual Framework

After reviewing the principal theories of this research: resource-based view and dynamic capability theory, contingency theory and stakeholder theory concepts and literatures for latent variables (social factor, organization environment, control system, technological innovation and firm performance). This structured investigation is based on the objectives and research questions. The literature reports the need for quantitative research that provides insights into different variables affecting gold mining firm financial performance and concepts and factors along with their interrelations with other constructs (Ahrens & Chapman, 2007; Henri, 2006a; Henri & Journeault, 2010). The researcher was able to analyze and synthesize the effect of variables after reviewing the literatures. The following conceptual model was shaped through these variables, as follows: social factor with observing variables on operator proficiency, training needs, social attitude and organization environment with observing variables of with observing variables on environmental comfort, dynamism, and safety through mediating variables of technological innovation consists of three observing variables: technology productivity, reliability, and efficiency and control system with observing variables of control and information system, operating compliance and capabilities toward firm performance which consist of three observing variables: profitability, growth, and market value. All these variables were extracted from the review of academic literatures. Furthermore, the linkages between the variables were developed based on the theoretical framework. Figure 2.11 presents the theoretical model for this study.

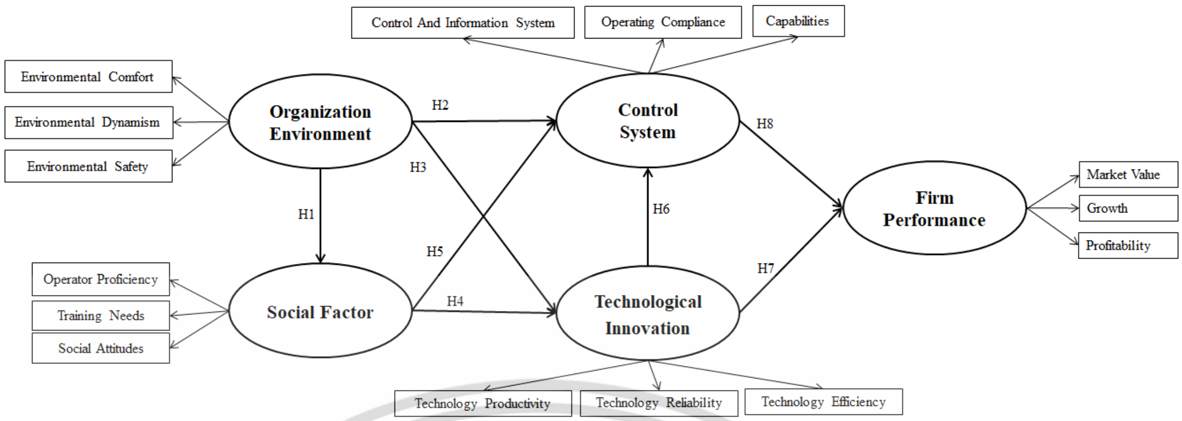

Figure 2.11. Conceptual Model for effects variables on gold mining firm performance**.**

Note: The figure shows the relations of organization environment, social factor toward mediating factors of technological innovation and control system that affect firm performance.

2.10 Hypotheses

In this study, there is a total of 8 hypotheses.

Hypothesis 1. Organization Environment Affects Social Factor of East African Gold Mining Companies.

Hypothesis 2. Organization Environment Affects Control System of East African Gold Mining Companies.

Hypothesis 3. Organization Environment Affects Technological Innovation of East African Gold Mining Companies.

Hypothesis 4. Social Factor Affects Technological Innovation of East African Gold Mining Companies.

Hypothesis 5. Social Factor Affects Control System of East African Gold Mining Companies.

Hypothesis 6. Technological Innovation Affects control system of East African Gold Mining Companies.

Hypothesis 7. Technological Innovation Affects Firm performance of East African Gold Mining Companies.

Hypothesis 8. Control system Affects Firm performance of East African Gold Mining Companies.

Table 2.20 Variables of the study

Latent variables	**Observant variables**	**Mediating variables**	**Observant variables**
Organization Environment	1.Environmental Comfort 2.Environmental Dynamism 3.Environmental Safety	Technological Innovation	1. Technology Productivity 2. Technology Reliability 3. Technology Efficiency
Social Factor	1.Operator proficiency 2.Training needs 3.Social Attitudes	Control System	1.Control and Information System 2.Operating Compliance 3.Capabilities
Firm performance	1.Profitability 2.Growth 3.Market Value		

2.11 Summary

From the literature review, various factors influence gold mining firm financial performance in Eastern African Community. Main categories of technological innovation and control system are among the most important variables influence gold mining firm performance. Therefore, this research conceptual model presents performance identification process by specifying problems and hindrances and types of variables that influence the financial performance of gold mining firm and subsequent impact on the gold mining businesses. The results lead to understanding variables affecting gold mining firm financial performance through assessment process by analyzing causes, relationships between various factors of significant influence. The researcher can then develop the research hypotheses which lead to the research methodology in the next chapter.

CHAPTER 3

RESEARCH METHODOLOGY

This research explores the relationship of variables that affect Gold Mining Firm Performance through mediating factors of technological innovation and control system by examining this research based on a structural equation model. This is a quantitative research, in which a questionnaire collects information. Researcher designed the research methodology that comprises of details as follows.

3.1 Research Design
3.2 Research Variables
3.3 Population and Samples
3.4 Research Instrument
3.5 Data Collection and procedures
3.6 Statistical Data Analysis and Interpretation
3.7 Data Analysis Procedure
3.8 Summary

3.1 Research Design

This section presents research methods and constitutes a significant aspect of this research, as it enables the investigator to attain the quality, standard and academic validity of it. In reviewing the literature and in creating a study structure, the study method consists of two steps:

The first step is to study preliminary information using ideas, theories, articles, scholarly publications, and internet information as secondary data. The investigator then started to synthesize the distinct variables of each study published in global journals and researches. The objective is to synthesize these variables in the existing study structure, which can be used properly and with reliability. Thus, having checked ideas, theories, and prior research, one observed, autonomous, synthesized variable comprising three observed variables, three mediating variables, and one dependent, comprising three observed variables, can be synthesized. The second phase includes quantitative research, used in the study phase, the study tool, and the statistical analysis of information. Summary of research plan:

a) Reviewing literatures, research articles in order to identify research questions and objectives.

b) Reviewing literatures and theories further to develop conceptual framework and choosing the appropriate research instruments.

c) Based on factors of latent variables and literatures to develop pilot study questionnaire.

d) In order to improve the quality of research, deploy pilot study questionnaire and conduct factor analysis.

e) Quantitative research and implementation.

f) Data collection, analysis and conclusion.

g) Report on results, finding, conclusion and research implication as shown in figure 3.1.

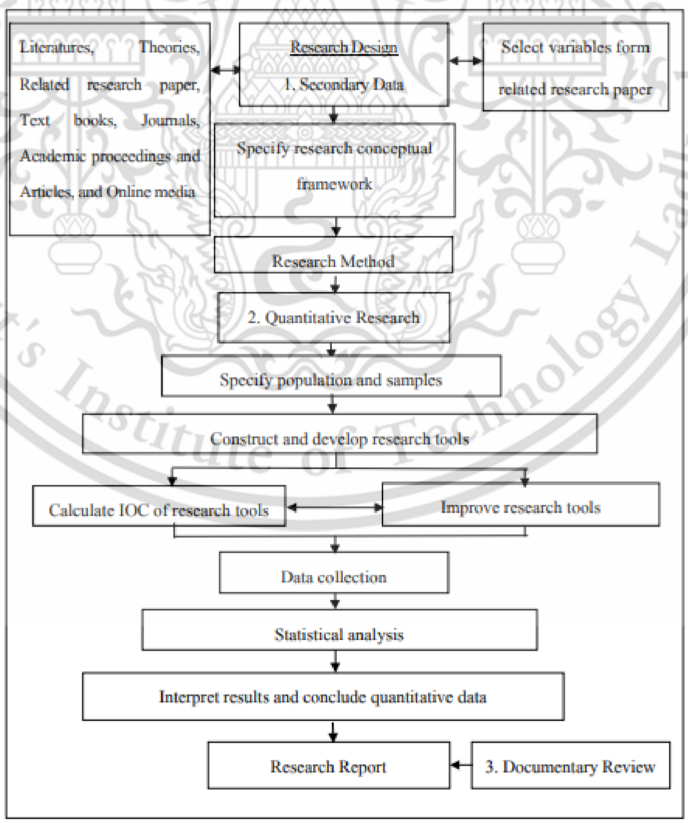

Figure 3.1 Research Process

3.2 Research Variables

The researcher collected data, reviewed literatures, concepts, theories, academic journals, and related research paper, and then summarized variables for this study as follows.

1. Exogenous latent variables: 1 variable

1.1 Organization Environment consists of 3 observed variables which are

1.1.1 Environmental Safety

1.1.2 Environmental Dynamism

1.1.3 Environmental Comfort

2. Mediator/Intervening construct variable: 3 variables

2.1 Social Factor consists of 3 observed variables which are

2.1.1 Operator Proficiency

2.1.2 Training Need

2.1.3 Social Attitudes

2.2 Technological Innovation consists of 3 observed variables which are

2.2.1 Technology Productivity

2.2.2 Technology Reliability

2.2.3 Technology Efficiency

2.3 Control System consists of 3 observed variables which are

2.3.1 Control and Information system

2.3.2 Operating Compliance

2.3.3 Capabilities

3. Endogenous Latent Variable: 1 variable

3.1Firm Performance (FP) consists of 3 observed variables which are

3.1.1 Market Value

3.1.2 Growth

3.1.3 Profitability

3.3 Population and Sample

3.1.1 Population and Sample

The total population of 179 precious mineral mining companies at EAC along with detailed information on the following precious mineral mining companies with active projects in EAC: 23 in Republics of Burundi, 31 in Kenya, 19 in Rwanda, 14 in South Sudan, 71 in the United Republic of Tanzania, and 21 in the Republic of Uganda (Projectsiq.co.za, 2020). 65 companies were selected through stratified random sampling. The questionnaires for this research were sent to gold mining firms, to key persons in management position, in each company. They were responsible as firm main stakeholders and decision makers in senior levels (Kindström, Ottosson, & Thollander, 2017), which were the 1) as the vice president, 2) sales manager, 3) chief executive officer, 4) chief finance officer, 5) operational executives, 6) chief human resource officer, from the selected 65 companies based on stratified random sampling from gold mining firms in The Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters in Arusha, Tanzania.

3.1.2 Sampling Technique and Sample Size

From a total population of 179 mining companies, 65 companies were selected through stratified random sampling. Stratified random sampling is a method of sampling that involves the division of a population into smaller sub-groups known as strata. In stratified random sampling, the strata are formed based on members' shared attributes or characteristics such as income or Scale and the number of employees (Frey, 2018). This research divide subgroups with 4 strata which include: Number of Employees, Mining Scale, Annual Revenue and Gold as the main Mining Commodity. Each company is considered to have minimum100 employees or more in total. Mining scale is considered, intermediate in size. Mining companies are often divided into three categories according to size: majors, intermediate and juniors.).“Intermediate” mining companies are usually defined as those which operate one or more small mines (Thomson and MacDonald, 2001). The annual total revenue for each mining company considered with minimum of 2 million US dollar or more. Mining companies to mine gold as the main commodity among other minerals. Calculating the minimum sample size, considering the anticipated impact magnitude, the required p-value, the required statistical support, and the number of observes and latent variables for a structural equation model (SEM) study with latent factors. Considering the as Number of latent variables: 5, Number of observed variables: 15, Anticipated effect size: 0.2, Desired statistical power level: 0.8, based on (Hair et al., 2010).

The sample size in this study is based on criteria of Hair et al. (2010) as minimum sample size is suggested to be 100 for researches where the model containing five or fewer construct and for each with more than three items with high communalities (0.6 or higher). As for models which comprise seven or fewer constructs and modest communalities (0.5) the sample size should be 150. Models which include seven or fewer constructs and low communalities (0.45) and/or multiple under identified (fewer than three items) constructs, 300 samples are appropriate.A minimum sample size of 100-150 participants suggested for models with four or fewer latent variables and for five or more latent variables 350 to 450 suggested (Hair, Black, Babin & Anderson, 2010). After questionnaires were sent to gold mining firms only completed questionnaires were collected and used based on stratified random sampling method. This sampling technique is subject to a number of population and the sample size applicable with quantitative statistic, SEM. The sample size can be determined by the following criteria. Standard sample size (n) = ratio of the selected rule of thumb x manifest observing variables Manifest variables of this study are 15 so the range of standard sample size should be minimum 15 x 20 = 300 based on Hair et al (2010). Several researchers suggested minimum sample of 390 to 400 to increase measurement accuracy for models with 5 latent variables (Brown, 2006; Gagné & Hancock, 2006; Velicer & Fava, 1998) with more indicators per factor (Gagné & Hancock, 2006; Marsh, Hau, Balla, & Grayson, 1996) and with larger factor loadings (Jackson, 2001) are more likely to converge properly. Therefore 65 companies selected through stratified random sampling consist of 390 top executives considered as the main decision makers in senior levels.

3.4 Research Instrument

In conducting this survey, the researcher selected the following tools for collecting quantitative data. The researcher used the questionnaire as a tool to collect data that matches the conceptual framework in this research. The conceptual framework reflects the structure for this study and the basis for the development of the hypotheses.

3.4.1 Developing Measurement tools

a. Collect data from theories, concepts and guidelines relevant to questionnaire structure.

b. Study the relationship between exogenous, mediating and endogenous variables.

c. The test questionnaire was reviewed by experts from academic and industry.to check for Index of Item-Objective Congruence (IOC) between questions in the test questionnaire and research objectives and research problems. The opinion for each question consists of 3 scores, which are 1) +1; certain that the research objectives are congruent to the question, 2) 0; uncertain, 0, and 3) -1; certain that that the research objectives are incongruent. The average score is the IOC that must be between 0.5 - 1.0. If IOC score is less than 0.5, the test question has to be revised so that each question meets the research objectives.

d. Revise the questionnaire based on expert recommendations.

e. Test revise version of questionnaire as based on expert's recommendations to review clarifies any issues for 30 sample of pilot study.

f. Test questionnaire pilot result 30 samples for reliability through calculating Cronbach's alpha or coefficient reliability. The Cronbach's alpha must be greater than or equal to accepted criterion of 0.70.

g. Improve the questionnaire to complete the final version of questionnaire which is going to be used for data collection.

3.4.2 Questionnaire Structure

The questionnaire was then last submitted to the experts for inspection, and suggestions were made for a full version of the questionnaire before the data collection. The complete questionnaire can be discovered in Appendix B. A questionnaire is a research tool for this research. The group sample consists of top executives of 65 companies.

Part one consists of six private data items, such as (1) sex (2) age (3) present title/position (4) organizational name (5) education level, and (6) years of job experience.

Part two has a total of 53 items, consisting of the five observed variables of gold mining firms: (1) organization environment with twelve items (2) social factor with eleven items (3) technological innovation with ten items (4) control system with eleven items (5) firm performance with nine items.

Measurement Scale for Questionnaire Development

Researcher designed a questionnaire to be used as a tool for quantitative analysis. Researcher developed questionnaire concepts, theories, literatures which concluded in chapter 2 and from various international journals and researches, presented in Table 3.1.

Table 3.1 Measurement Scale for Development Questionnaire from Previous Research

Variables	Adopted from	Number of Items
Exogenous Latent Variables: Organization Environment		
Environmental Safety	Nolan, & Morley, (2014), Bushiri (2014).	Item 1 to 4
Environmental Dynamism	Hueske etl. (2015), Vasco (2011).	Item 5 to 8
Environmental Comfort	Schaltegger & Wagner (2017), Orth (2015).	Item 9 to 12
Mediating Variables: Social Factor		
Operator Proficiency	Bevan (2012), Engetou (2017).	Item13 to 15
Training Need	Saleem (2015), Arinanye (2015).	Item16 to 19
Social Attitudes	Zhang, Lee, & Wong (2016), Colorosa (2016).	Item20 to 23

Table 3.1 Measurement Scale for Development Questionnaire from Previous Research **(Continue)**

Variables	Adopted from	Number of Items
Technological Innovation		
Technology Productivity	Csugány (2016),BinZainuddin (2017).	Item24 to 26
Technology Reliability	Hadjimanolis (1997),Camisón & Villar-López (2014).	Item27 to 30
Technology Efficiency	Lee (2015), Cooper (2018).	Item31to 33
Control System		
Control and Information System	Chenhall (2003), Argyropoulou (2017).	Item34 to 37
Operating Compliance	Egbe (2015), Argyropoulou (2017), Saif (2015).	Item38 to 40
Capabilities	Wijethilake &Ekanayake (2018), Orzoco (2016).	Item41 to 44
Endogenous Latent Variable:		
Firm Performance		
Profitability	Basit, & Hassan (2017), Abutawahina (2015).	Item45 to 47
Growth	Mpanju (2019), Nkundabanyanga (2016), Jelfs (2019).	Item 48 to50
Market Value	Nyamita (2014), Nilsson (2002), Kaldybekova (2018).	Item 51 to53

Table 3.1 offers a summary of the study variables including exogenous, mediating and endogenous variables for the development of the study instrument questionnaire. The 53 items in the questionnaire are based on previous research which presented in chapter 2 in details.

The try out questionnaire was tested for content validity calculated by the index of item-objective congruence (IOC) scored by 5 experts from academic and industry. Any questions with value under 0.6 were excluded (Rovinelli & Hambleton, 1997). A reliability of the questionnaire was also applied with 30 sample respondents representing similar characteristics as those of target groups. The Cronbach's alpha exhibited coefficient of reliability of each questionnaire fall within the acceptable range from 0.874 to 0.881, as shown in the appendix D with details of each item, above the accepted level of 0.7 (Bearden, Netemeyer, & Mobley, 1989).

All transformed values are completely converted into the 7-point Likert scale ranging from 1 to 7 for each measured variable. The interpretation of these converted values, such as mean, standard deviation, skewness, and kurtosis, for this particular research study, is determined by the researcher to be applicable with interpretation table and its measured variables as shown in section for Statistical Data Analysis and Interpretation. The initial data for tryout questionnaire, which are calculated according to corresponding theories, presented in the following information demonstrate the mean and standard deviation of measured variables that fall within the acceptable range before transformation that are applicable for this research. The mean range between minimum 5.54 to maximum 5.81 and the standard deviation range from minimum 1.007 to maximum 1.201.

These initial data are difficult to be interpreted and compared among each other. The summary of converted values, descriptive statistics, and their interpretation are shown in Chapter 4.

From Part two of the questionnaire, respondents were asked to make personal judgments according to the 7-point Likert type scale. 7 liker interpretation according to (Sullivan, & Artino, 2013). Interpretation of different opinions range from Strongly Agree to Strongly Disagree, and the average score had the following criteria:

Table 3.2 7-point Likert type scale

Strongly Agree	7 points
Agree	6 points
Somewhat Agree	5 points
Neither Agree nor Disagree	4 points
Somewhat Disagree	3 points
Disagree	2 points
Strongly Disagree	1 point

3.4.3 Quality of research instruments

Examination of the quality of questionnaires was conducted by bringing a sample questionnaire to five experts from mining industry and academic to examine the questions in the questionnaire for complete and covering content, and enough comprehension on the subject being measured including language that respondents are able to read, easy to understand, and to the point. After that, the questionnaires were tested for 1) content validity and 2) reliability.

1) Content Validity:

To ensure the content and construct validity and appropriateness, the materials were evaluated using an assessment form (Item-Objective Congruence Index, IOC) to ensure the consistency of the materials. Three specialist lecturers from this research area and two specialists from the mining industry analyzed it. The assessment form looked at layout and design, activities skills, language type and subject, and content. The entire assessment form was viewed on a three-point scale ranging from -1 to 1. Objects with scores greater than or equal to 0.5 were deemed appropriate; those with scores less than 0.5 were deemed unacceptable and had to be updated following the experts' recommendations and items between 0.5 to 0.6 must be revised and items from 0.6 to 100 measured the attribute. All five items were presented in the seven-point form of the Likert scales to examine public opinion on the developed material and the open-ended query. As a result, each scale had a list of answer categories ranging from 7 to strongly agree, 6 to agree, 5 to somewhat agree, 4 neither agree nor disagree, 3 to somewhat disagree, and 2 to disagree, 1 to strongly disagree.

The pretest or pilot study was defined by Pretest Zikmund, Carr & Griffin (2013) as practice with a small group of respondents. The researcher mentioned that a pretest helps in understanding the questionnaire and that the final survey is suitable. The test aims to determine whether the questionnaires are reliable to monitor the problem and prevent any ambiguity on questions, before official distribution of the questionnaire. Therefore, the researcher randomly carried out the pretest with 30 top executives of gold mining companies in East Africa to test the reliability of the questionnaire. Zikmund et al. (2013) indicated that the value of reliability should be at least 0.7 to be reliable and acceptable for research. For the questionnaire, on the other hand, it is unreliable and unacceptable if the alpha is less than 0.7. Following the preliminary results, the researcher had to change the question to make the entire study reliable.

The first part of the questionnaire's data was quantitatively analyzed. The Item-Objective Congruence (IOC) Index was used to assess the content validity of items in the questionnaire by three experts in the field of

this research. The IOC index is a number between -1 and 1. Items with indexes less than 0.5 should be updated. The results showed that all five items were scored higher than 0.5, indicating that they were congruent with the objective.

For the accuracy and congruency of the pieces, the IOC points are measured and divided into three rating scales. All committees were required to select only one response from these three alternatives as provided mark:

+1 = Congruent with strong comprehension,

0 = Uncertain or uncertain whether an item is related to the research,

-1 = Uncertain or uncertain whether an item is congruent or related to this study

1) Content Validity Formula:

$$IOC = \frac{\sum R}{N}$$

R	=	Congruent score
N	=	numbers of experts
1	=	Congruent
0	=	Questionable
-1	=	Incongruent

IOC score is range from -1 to +1, the closer to 1 the better it would be.

Total points for each object must have a consistency value of 0.50 or higher.

How to determine content validity.

The item with IOC score $\geq$ 0.6 – 1.00 the item measured the attribute.

The item with IOC score between 0.5 - 0.6 the item must be revised.

The item with IOC score $\leq$ 0.50 the item must be removed.

2) Measurement Reliability

The researcher then proceeds to evaluate the questionnaire with 30 samples equal to the sampled group. Cronbach's Alpha is accurate only by variables when greater than 0.7 for (Li, Wu, Holsapple, & Goldsby, 2017). When information is obtained from the Likert scale, the researcher uses Cronbach alpha coefficients to determine the accuracy or consistency of the questionnaire. The calculation formula is as follows: Cronbach’s Alpha Formula

The formula for Cronbach’s alpha is:

Where:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

N = the number of items.

$\bar{C}$ = average covariance between item-pairs.

$\bar{V}$ = average variance.

The question to test the reliability using the Cronbach Alpha coefficient was placed following an analysis of the IOC value. The reliability of the questionnaire was tested for content validity calculated by the index of item-objective congruence. A reliability of questionnaire was also applied with 30 sample respondents representing similar characteristics as those of target groups. This was used to test the reliability of the questionnaire and were higher than 0.7. Reliability is considered high when it reaches 0.7. Reliability refers to content (also known as face, intrinsic, or curricular) validity as internal validity when the research content is related to the variables being studied and follows a logical pattern. Construct validity (or factorial validity) – determines whether the chosen research criteria are meaningful in comparison to other possible standards; criterion validity (or concurrent validity) – determines whether the underlying construct is being measured and is composed of three critical components: convergent validity (the degree to which two instruments designed to measure the same construct converge on the same construct); and concurrent validity (the degree to which two instruments designed to measure the same construct converge on the same construct) (or factorial validity). The Cronbach’s alpha exhibited coefficient reliability above 0.80 for most criteria indicating variables are reliable as shown in appendix E.

Table 3.3 The list of IOC Experts evaluating the questionnaires

1. Mr. Majid Gheibi: Managing Director, MJ Consultancy, Jeweler, and mineral mining expert. Thailand
2. Mr. Lupisaly Haja Atem: Managing Director, Lilico engineering services and consultancy, mineral mining engineer, and expert. South Sudan.
3. Dr. Shahryar Sorooshian: Lecturer, University of Gothenburg, Sweden.
4.Dr Puris Sornsarut: Lecturer, KBS, King Mongkut's institute of Technology Ladkrabang, Thailand
5. Dr Ornicha Norkaew: Lecturer, CEIR, King Mongkut's institute of Technology Ladkrabang, Thailand.

3.5 Data Collection Procedures

The Use of the Survey Method

The objective of the study is to generalize a population from a sample. Evans-Lacko et al. (2013) described the study as a "scheme of data collection from or regarding individuals for their understanding, attitudes, and conduct to be described, compared, or explained." Data is gathered from online self-administered questionnaires and structured log reviews for this research. In an online self-administered questionnaire, participants automatically complete the questionnaire. A structured record review is a method to help in gathering economic, medical, and academic information.

The Writing Survey (TWS) style adopted from Saad & Zhengee (2016) along with the Research-developed for companies information forms (CIF). The questionnaires were to be administered during the work period and received authorization. An Email inviting 390 respondents to engage in the research sent to them. Afterward, the researcher followed up with the respondents on a phone call as well.

E-mails are acquired from the chairman of the Communications Department. The investigator then approached every targeted respondent to collect information. The investigator was liable for the collection and protection of the information.

The names of participants have been removed from the questionnaires and no personal identifiers have been entered into the database. The researcher has studied and summarized concepts, theories, literatures and related researches, from various sources which include academic journals, textbooks, articles, commercial paper, media on the internet, and statistical data from various institutions, both public and private sectors.

3.6 Statistical Data Analysis and Interpretation

After reviewing the questionnaire and check correctness, Researcher defined, encoded data for preliminary information to meet the conventional of statistical analysis. This research set determined significance level of acceptance of the error (α) equal to 0.05 and confidential level at 95 percent.

3.6.1 Basic Statistical analysis:

Descriptive

Descriptive statistic, frequency and percentage are used to explain general information of respondents. Mean, Coefficient of variance, Standard Deviation, Coefficient of Variance, Skewness and Kurtosis by AMOS version of 24 that are used to explain the variance in this research model.

Mean interpretation according to (Sullivan, & Artino, 2013). Interpretation of different opinions range from Strongly Agree to Strongly Disagree, and the average score had the following criteria:

Table 3.4 Mean Interpretation, Level of Opinion

Range of mean value	Interpretation
6.16-7.00	Opinion of management strongly agree for practices and procedures in their organization
5.30-6.15	Opinion of management agree for practices and procedures in their organization
4.44-5.29	Opinion of management somewhat agree for practices and procedures in their organization

Table 3.4 Mean Interpretation, Level of Opinion **(Continue)**

Range of mean value	**Interpretation**
3.58-4.43	Opinion of management Neither Agree nor Disagree for practices and procedures in their organization
2.72-3.57	Opinion of management Somewhat Disagree for practices and procedures in their organization
1.86-2.71	Opinion of management Disagree for practices and procedures in their organization
1.00-1.85	Opinion of management Strongly Disagree for practices and procedures in their organization

Standard Deviation table:

Interpretation of standard deviation in the case of 7 point scale rating by Rensis Likert, (1932)

Table3.5 Standard Deviation Interpretation

Range of Standard Deviation	Interpretation
Value higher than 1.75	High variance
Value between 1.25 to 1.75	Fairly High variance
Value less than 1.25	Low variance

Skewness and Kurtosis interpretation

According to Hair et al. (2010), Bryne (2010) and Kline (2011) argued that data is considered to be normal if skewness is between -2 to +2 and kurtosis is between -7 to +7 for the samples population of more than 300. AMOS software packages is used to test whether and to what extend the distribution of data of each observant variable display a normal distribution or not. Pearson's product moment correlation coefficient (PPMCC) is used to indicate and Analysis the relationship between variables through AMOS software package**.** A positively skewed distribution is a sort of distribution where, unlike symmetrically distributed data where all measures of the central tendency (mean, median, and mode) equal each other, with positively skewed data, the measures are dispersing, which means Positively Skewed Distribution is a type of distribution where the mean, median, and mode of the distribution are positive rather than negative or zero. A negatively skewed distribution is the straight reverse of a positively skewed distribution. In statistics, negatively skewed distribution refers to the distribution model where more values are plots on the right side of the graph, and the tail of the distribution is spreading on the left side. Skewness essentially measures the symmetry of the distribution, while kurtosis determines the heaviness of the distribution tails.

The analysis of relationships between variables

The relationships between variables are designated Pearson correlation coefficient that can be obtained from AMOS software package**.**

Correlation interpretation

Value of observed variables range -1 to 1. The positive sign means 2 variables have relationship in the same direction vice versa.

Criteria interpretation for correlation coefficient according to (Hinkle 1998). Cohen (1988), also categorize similar indicators for large effect size (0.5 <r < 1.0), medium effect size (0.3 <r < 0.5) and small effect size (0.1 < r < 0.3).

Table 3.6 Interpretation of Correlation Coefficient

Correlation Coefficient, r	Distribution Shape of Data
r > 0.9	Extremely High Correlation
0.7 < r < 0.9	Moderate High Correlation
0.5 < r < 0.7	Moderate Correlation
0.3 < r < 0.5	Moderate Low Correlation
r < 0.3	Extremely Low Correlation

3.6.2 Test for Suitability of Data for Factor Analysis

According to Wanichbancha (2011), KMO which stand for Kaiser – Meyer – Olkin can be used for sampling competence of each variable in the model through measuring percentage of variance among common or lower variance to more suitable data for factor analysis. KMO close to (1.0) is generally considered high and specify that a factor analysis could be suitable with research data. If the value is less than (0.50) most likely the result of factor analysis will not be useful to the research. In order to test the null hypothesis to measure whether the observed variables are unrelated, Bartlett's Test of Sphericity is used. If the null hypothesis (H0) is recognized, factor analysis should not be used because correlation matrix is an identity matrix, inappropriate for structure recognition. Small Bartlett's Test of Sphericity values (less than 0.05) of the level of significance designate that a factor analysis could be suitable for research data. To investigate the consistency of conceptual Framework of this research that were synthesized from literature reviews, concepts, and related theories and manifest variables with AMOS software package.

3.6.3 Statistics for Analyzing Structural Equation Modeling (SEM)

This research uses Structural Equation Modeling (SEM) which is the model that combines the two principles of linear analysis statistics that are Path Analysis and Factor Analysis. The Structural Equation Model (SEM) is a multivariate analysis technique that combines Factor Analysis and Multiple Regression. SEM method are used to inspect the relationships between several variables in the theoretical research framework model which include direct and indirect effect, within one time. Among the statistical software programs commonly used in the SEM include AMOS and LISERL etc. (Hair et al., 2010). The researcher uses AMOS software package to study the relation between variables by testing constructed on theories, and analyze the relationship between latent variables and indicators, or measured variables, by investigating on the quality of the measurement. The AMOS software program enhances the possibility to evaluate variance and covariance. This technique is also applied with Confirmatory Factor Analysis (CFA) to examine the quality of measurement construction. The objective of this technique is to test hypotheses and relationship between latent variables and latent toward observing variables and to explore relationship between independent, mediating and dependent variables (Wanichbancha, 2011).

3.6.4 Factor Analysis

Factor Analysis is a technique used to study the relationship structure of observed variables in researches. Factor analysis techniques analyze the structure of the correlation of observable variables, group the observed variables that are correlated together, called factors, and treat the generated factors as new variables. Therefore, the factor analysis is considered as classification of several observable variables. Confirmatory Factor Analysis (CFA) is used when the researcher has known the structure of the correlation of the observed variables, which can be constructed on related theories or reviews of applicable researches. Therefore, the researcher created a model demonstrating the relationship of the variables. Therefore, the researcher expects some of the variables that are highly correlated and should be constructed under mutual factors. The researcher typically knows the number of factors before and then uses techniques for verification of variables relationship in the model whether the results are in align with expectations or not. Confirmation Factor Analysis is critically important for measurement model and to analyze SEM. Therefore, the factor analysis for this research is the CFA analyzed by AMOS program before all the data are used to test the research hypotheses (Wanichbancha, 2013).

The steps are as follows:

1) Create models of factors based on concepts and theories for the relationships between latent variables and observed variables.

2) Validate data, including the analysis of the correlation matrix by SPSS for Windows, calculate the correlation coefficient between observed variables and latent variables by the Pearson's correlation statistic.

3) analyze results of CFA by AMOS program with Goodness of Fit statistics which have the most common criteria to be considered, which include a) chi-square value that should be insignificant b) Chi-square/df that must not exceed 2, and c) Root Mean Square Error of Approximation (RMSEA) that must be less than 0.05.

3.6.5 Structural Equation Model Analysis

The steps of SEM analysis are as following:

a) Examine the multicollinearity all observed variables must be independent and correlation between all pairs of observed variables must be less than 0.90 in order to pass this criterion, (Hair et al., 2010). Then b) Evaluate measurement model validity: which depends pass acceptable criteria of goodness of fit and pass construct validity as well as pass reliability for dimension measurement of the goodness of model fit for SEM as well as CFA is determined.

This is done through a) Absolute Fit Indices which designate how well the research model fits the empirical data which include p-value of Chi-squares ($\chi 2$), Relative Chi-square (CMIN/df), Goodness of Fit Index (GFI), and Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA), b) Incremental Fit Indices that specify how well the assessed research model fits comparative to a baseline model that assumes all observed variables are uncorrelated. Incremental Fit Index (IFI), Comparative Fit Index (CFI) and Normed Fit Index (NFI), and c) Parsimony Fit Indices which specify which model among competing models (comparative to their complexity as more complex models are more likely to fit the data effectively) shows the best fitting. Adjusted Goodness of Fit Index (AGFI). The details are explained in table for SEM statistical criteria for the research model. Construct validity determines the extent to which a set of observed variables represents the latent variables that were constructed in relation to theories. It comprises of convergent validity and discriminant validity. The standardized factor loading (with t-value greater than |1.96| or p- value is greater 0.05 of each observed variable must be higher than 0.35(Hair et al., 2010) and this indicates the degree of strength of that observed variable in the measurement model. Convergent validity measure how close of a set of observed variables altogether to determine their latent variables. The Average Variance Extracted (AVE) of each latent variable must be equal to or greater than 0.5 (Hair et al., 2010). Discriminant validity tests whether two dissimilar constructs measure the same thing or not and the relationship between measures from different constructs should be very low. Pearson's correlation coefficients between pairs of latent variables must be less than the square root of the extracted average variance (AVE) (Hair et al., 2010).

$$\text{AVE} = \frac{\sum \text{Standardized factor loading}^2}{[\sum \text{Standardized factor loading}^2 + \sum \text{Variance(error)}]}$$

$$\text{Communality or Common Variance} = \sum \text{Standardized factor loading}^2$$

Reliability is measure by Composite Reliability (C.R. > 0.7, Hair et al., 2010) that indicates the shared variance among the set of observed variables of a latent variable (internal consistency reliability).

$$\text{C.R.} = \frac{(\sum \text{Standardized factor loading})^2}{[\ (\sum \text{Standardized loading})^2 + \sum \text{Variance(error)}\ ]}$$

Variance(error) = variance of the error term for the ith indicator

3.6.6 Structural Equation Model Assessment

SEM presents relationship between all pairs of latent variables in the form of a linear regression. These matters are listed below:

a) The direction of each regression coefficient must follow the theories of the study

b) Each regression coefficient must be statistically significant

c) Coefficient of Determination (R2) must be higher than 0.50 (Hair et al., 2010).

3.6.7 Model Modification

Model modification is used when common variance of the research model does not fit the total variance of empirical data or measurement errors between the research model and empirical data differ largely. The aim of model adjustment is to estimate new parameters by expecting that the difference of the measurement errors will decrease. AMOS program generates Modification Index (MI) as a guide for model adjustment. MI roughly indicates that if a new parameter is added in the research model, the $\chi 2$ of the model will decrease to MI. The model MI with the largest value is the first model to be modified (one at a time, and re-assess), however the model modification has to be explained in terms of theories as well as empirical data. Model adjustment relying on MI only is not sufficient because MI may not help find the right model.

Henceforth, any constraint with Standardized Residual value higher than 2.58 can be added and evaluate the research model again. If any parameter with Standardized Residual value less than 2.58, the parameter should be deleted and analyze the research model again. There are two steps as following (Hair et al., 2010; Wanichbancha, 2013; Chartpolrak, 2021).

1) Examine the overall model in a complete view

2) Examine parameters particularly the influence of independent variables that affect dependent variables i.e., regression coefficient, standardized regression weight, Standardized Residual, Item Reliability (Communality, Variance extracted, or squared multiple correlation: R2), and MI.

Table 3.7 SEM Statistical Criteria for Research Model

Statistics	Symbol	Objective	Accepted level
Goodness of Fit Index	GFI	To measure the goodness of fit of SEM as a whole	>0.90
Chi-square	χ2	Examine null hypothesis that the theoretical and conceptual research outline model is fit with empirical data overall	Ns. ($p>0.05$)
Standardized Root Mean Square Residual	Standardized RMR(SRMS)	To assess the covariance that are not explained by the model, by calculating the square root of the discrepancy between the elements of sample covariance matrix and the covariance matrix predicted by the model. SRMR values range between 0-1.	<0.05
Relative Chi-square	CMIN/df or χ2/df	Test the steadiness among the conceptual research framework model and empirical data	< 2.00
Root Mean Square Error of Approximation	RMSEA	To assess how well the model would fit the population covariance matrix. RMSEA values range between 0-1.	<0.08
Comparative Fit Index	CFI	To analyze the model fit by examining the inconsistency between the empirical data and the hypothesized model. Values range between 0-1.00.	>0.90

Table 3.7 SEM Statistical Criteria for Research Model **(Continue)**

Statistics	Symbol	Objective	Accepted level
Incremental Fit Index	IFI	Test how well the estimated model fits the baseline (null model) that assumes all observed variables uncorrelated regardless of sample size.	> 0.90
Normed Fit Index	NFI	To analyze the discrepancy between the chi-squared value of hypothesized model and the chi-squared value of the null mode.	≥ 0.90
Adjusted Goodness of Fit Index	AGFI	To evaluate the overall goodness of fit of SEM by taking into account differing degrees of model complexity by penalizing more complex models and favoring those with a minimum number of free paths. AGFI values range between 0-1.	≥ 0.90

Source: Hair et al. (2010), Bollen (1989), Carmines & McIver (1981), Schumacker & Lomax (2010) Wanichbancha (2013), Chartpolrak (2021).

3.6.8 Structured Means Analysis.

After the factor structure of each latent variable is verified by CFA for the group of top executives, structural equation modeling is applied to the study of organized means (Millsap, 2012) as a basis for research variations between the groups of means of each derived latent variable. These analyzes were performed concurrently through a multi-group approach, using the whole analysis sample groups (Byrne & Van de Vijver, 2010). The mean of each latent variable in the top executive's group can thus be used to represent the difference between gold mining companies. All assumptions were met in testing hypotheses for structured means analysis. The study of structured means is intended to provide information on whether or not there are relationships between latent variables.

3.6.9 Structural Equation Modeling.

To determine the relationships between derived and observed variables, Access to Services/Supports, the AMOS software package is used for various structural equation models with estimates of missing values and maximum probability (MP) estimation procedures. The proposed relationships between constructions are outlined. Sample estimation procedures for structural equation (SEM) assume that the hypothesized model is correct, the sample covariance matrix is analyzed, and that the sample is larger sufficient to quantify the size of the data set, including independent sample distribution, the normal multi-variant distribution of calculated variables. In testing assumptions of the MP procedure, all assumptions were fulfilled except that mild ranges of non-normality suggested by moderate skew and kurtosis were shown by calculated variables. Raw empirical data rarely achieves the multivariate normality required to apply SEM hypothesis testing, with MP estimates. In simulation studies, when Skew and Kurtosis estimates are within moderate non-normality levels (Skew=2, Kurtosis=8) for most variables the results of ML estimations are minimal, especially for the wide-range sample size, and in moderate variables correlations. (Skew=2, Kurtosis=8) In this study, the skew and kurtosis of the most measured metrics used in SEM dropped to the moderate non-normality threshold so in this analysis the ML estimate is appropriate. A theoretically driven model was tested and subsequently revised to improve fit in the SEM model development framework. Because of the discovery and the moderate non-normality of the data from the initial model development, the model is developed using the individual's exploratory group (N=390), and then checked using the confirmatory group (N = 390) from each sample (top executives respectively). The squared multi-correlations (R2), which describe the relative contributions of each latent variable to the other latent variables, and regression estimates (β), are the metrics used to evaluate the contribution of each measured variable to its corresponding latent variable. The overall fitness of the structural models is measured by using several fitness indices.

3.7 Data Analysis Procedure

This chapter defines measures to prepare the analysis information. This chapter also offers a rationale for using data analytics to answer the questions of this study.

Data Entry

Prior to entering the data in the Social Sciences Statistics Package (AMOS), the researcher re-identified and defined the variables and data.

3.7.1 Rationale for the Use of Structural Equation Modeling (SEM)

A hypothesis tested using Structural Equation Modeling Analysis (SEM) using AMOS for SEM can be used to evaluate measurement and structural models as an information analysis procedure. This research focuses on analyzing the structural model, which can be assessed separately from the measuring system (Meyers et al., 2013). The following are generally used to measure model fit (Meyers et al., 2013): the statistical chi-square (0.2) probability ratio, goodness-of-fit (GFI), the standard-fit index (NFI), the comparative fit index (CFI), and a root mean square estimation error (RMSEA).

The most significant absolute fit index is the chip-square (μ2) probability ratio statistics and tests for differences between the theoretical model and the empirical model (Meyers et al., 2013). An important β2 shows that the theoretical model whether it matches with the empirical information while a non-important μ2 shows a decent fit.

The GFI is in multiple regressions sharing conceptual similarities with the R2. It measures the relative quantity of variances and covariance represented by the model. Values equivalent to or above 0.90 show excellent model fit. The NFI examines the distinction between the hypothesized and zero chi-square values of the models. The CFI analyzes the difference between theoretical and empirical information. The RMSEA measures an approximation error between the observed covariance and the hypothesized model covariance (Meyers et al., 2013).

The Structural Equation Model (SEM) is a statistical method used to analyze structural models that contain latent variables (Meyers, Gamst & Guarino, 2013). SEM is used to analyze two kinds of models: a measurement model and a structural model. The model evaluates the degree to which the connections between the factors are reflected in the interactions between the factors observed. The structural model measures the magnitude of the connection between latent constructs and the connection between other factors measured. The structural equation model can describe the hypothesized model if the information from the hypothesized model and the following model matches. The theories for study justify using structural equation modeling as a method of information assessments. The structural model examined and the structural model's validity compared to the model observed is tested in this study.

3.7.2 Sample Size Recommendations for the Use of Structural Equation Modeling

According to Khine et al. (2013), the sample size is an important consideration of SEM, and while many suggestions have been made in the literature for sample size, “no agreement is being reached between scientists at this moment”. However, structural equation modeling is appropriate for analyzing bigger sample sizes, although fewer instances may be used with smaller models (Khine , 2013).

A minimum sample size of 100-150 participants suggested for models with four or fewer latent variables and for five or more latent variables 350 to 450 suggested (Hair, Black, Babin & Anderson, 2010). As for Models which include a large number of constructs, some with lower communalities, and/or having fewer than three measured items should have at least 500 samples. The sample size can be determined by the following criteria. Standard sample size (n) = ratio of the selected rule of thumb x manifest observing variables Manifest variables of this study are 15 so the range of standard sample size should be minimum 15 x 20 = 300 based on Hair et al (2010). Various researcher suggest higher sample size number for better accuracy on SEM measurements, a minimum sample size suggested for models with for five and more variables 350 to 450 suggested (Hair, Black, Babin & Anderson, 2010). Other researchers suggested minimum sample of 390 to 400 to increase measurement accuracy for models with 5 latent variables (Brown, 2006; Gagné & Hancock, 2006; Velicer & Fava, 1998)

3.8 Summary

The researcher used quantitative approach by through the survey questionnaire to collect data from a sample of gold mining firms in Eastern African Community (EAC). The structural equation model is used to analyze the results. Furthermore, assessment approach by documentary review is conducted to confirm problems and obstacles and to measure the results are consistent with the empirical data.

CHAPTER 4

RESEARCH RESULTS AND DATA ANALYSIS

This chapter presents a comprehensive report of methods and procedures used during the study by following quantitative methodology. Reliability, validity, measurement, and structural model evaluation and testing of hypotheses are discussed in this chapter. Test results and predicted model hypotheses results are summarized. The following are the summaries of each section and are detailed in this chapter.

4.1 Descriptive Statistical Values Showing General Characteristics

4.2 Normality test, opinion level and descriptive Statistical Values

4.3 Research Measurement Model

4.4 Structural Model and Hypothesis Testing

This research consists of 53 questions of 7 constructs on the Likert scale. The questions include 12 items for organizational environments and 11 items for social factor. Technological innovation includes 10 items on a differential semantic scale. The control system comprises 11 items, and 9 items relate to firm performance. Chapter 4 contains the results for this research.

4.1 Descriptive Statistical Values Showing General Characteristics

Table 4.1 shows the basic demographic characteristics of the sample respondents. The demographics data reflect the categorization of the respondents for mining companies location for each country as Kenya and Tanzania madeup18% followed by Uganda and Burundi each consist of 17%, followed by Rwanda 16% and South Sudan 14 %. The number of executive managers in gold mining companies per country varies from 53 to 77. The position in the company data shows that 77 operational executives which made up of 20% of respondents followed by 69 Vice-Presidents and 68 Chief Financial Officers made up 18% and 17% of the respondents to this study. According to the findings, the least number of respondents are Chief executive officers who make up 13% of the respondents.

The data of the Respondents Experience in Mining Projects reflect that the companies experienced between 8 to 12 years in the gold mining industry make up 36% of the total, followed by executives with 13 to 17 years of experience in gold mining have a share of 24% percent of respondents shown in table 4.1. Respondents Data on the level of education reflect the majority of respondents are university. Bachelor degree holders, of which 78% consist of 305 participants and with 85 participants, the Master's degree is 22 percent, as shown in Table 4.1. The number of employees in gold mining companies shows that 72% of the companies have more than 100 employees, 15% have between 151 and 250 employees and only 12% of mining companies have between 251 and 500 employees. Data from the Mining Project Types show that 72% of companies mainly focus on gold mining projects while others mine gold along with other precious minerals, which include 13% of the companies mine copper and gold and 10% focused on gold and gems mining projects.

Table 4.1 General Characteristics of Sampling Respondents

Characteristic	Frequency	Percentage
Geographic Location of Gold Mining Companies		
Burundi	63	0.17
Kenya	71	0.18
Rwanda	64	0.16
South Sudan	56	0.14
Tanzania	70	0.18
Uganda	66	0.17
Total	390	100.0
Position in Gold Mining Companies	Frequency	Percentage
Chief Executive Officer	53	13%
Chief Finance Officer	68	17%
Chief Human Resource Officer	59	15%
Operational Executives	77	20%
Sales Manager	64	17%
Vice President	69	18%

Table 4.1 General Characteristics of Sampling Respondents **(Continue)**

Characteristic	Frequency	Percentage
Total	390	100.0
Respondents Experience in Mining Projects	Frequency	Percentage
3 to 7	70	18%
8 to 12	140	36%
13 to 17	94	24%
18 to 22	47	12%
23 to 27	23	6%
28 to 32	16	4%
Total	390	100.0
Respondents Level of Education	Frequency	Percentage
Bachelor	305	78%
Master	85	22%
Total	390	100%
Number of Employees in the Organization	Frequency	Percentage
> 100 to 150 staff	47	72%
151to 250 staff	10	15%
251 to 500 staff	8	12%
Total	65	100.0
Mining Project Types	Frequency	Percentage
Copper, Gold	50	13%
Gold	281	72%
Gold, Copper, Iron Ore	21	5%
Gold, Gems	38	10%
Total	390	100.0

4.2 Normality Test, Opinion Level and Descriptive Statistical Values

All items in the questionnaire used a seven-point Likert-type scale ranging from 1= Strongly Disagree to 7= Strongly Agree. Thus, according to the seven levels of frequency, the interpretation of these responses was calculated by using the highest score minus the lowest score and then divided by the number of intervals. Thus, the interval scale in this study is (7-1). Range of seven levels of frequency is: 6.16-7.00 = Strongly Agree, 5.30-6.15 =Agree, 4.44-5.29 = Somewhat Agree, 4.44-5.29 = Somewhat Agree, 3.58-4.43= Neither Agree nor Disagree, 2.72-3.57= Somewhat Disagree, 1.86-2.71=Disagree, 1.00-1.85= Strongly Disagree. Firm performance results are shown in Tables 4.2 shows the mean of the observed variables in the response which ranges from 5.309 to 5.713. In control system, the value of the maximum mean of observed variable Control and Information System No 42 "My Company adopts key performance indicators related to the goals and success factors of the strategic plan." meaning that majority of respondents identified that key performance indicator important to them.

In firm performance, profitability 3, No 45 has the maximum observed variable (mean= 5.713) "In my company, Improvement in Return on Sales (ROS) from our business is assured." As for Control system, the value of maximum observed variable, control and information system No 42 (mean=5.754) was the highest indicator with the most influence followed by control and information system No 41 (mean=5.703) "I believe that the existing structure allows adopting the system of performance evaluation." In terms of the social factor latent variable, the value of highest observed variable of training need No 21 (mean=5.720) "My colleagues are helpful when I need them to figure out the situation regarding an innovative issue in the company."

As of technological innovation, the highest observed variable is technology productivity No 32 (mean=5.663) "Information technology assists my company in serving new market segments." Organization environment maximum observed variable is environmental dynamism, No 6 (mean=5.734) "In my company, the machinery accuracy degree is high." While in normality test, skewness and kurtosis indicating a normal distribution of the data, as.according to Hair et al. (2010), Bryne (2010) and Kline (2011) argued that data is considered to be normal if skewness is between -2 to +2 and kurtosis is between -7 to +7 for the samples population of more than 300.

Table 4.2 Descriptive statistical data for Firm Performance and its manifest observing variables

No	**Observe Variables Indicators**	**Symbol**	**Mean**	**S.D**	**Remark**	**Skewness**	**Kurtosis**	**Remark**
	Market Value	Ma	5.452	1.086	somewhat agree			
53	My company needs to have a faster growing market.	MarketVa1	5.309	1.252	somewhat agree	-0.533	-0.119	pass
52	Construction of modern camps and machines have been implemented during the last fiscal year in my company	MarketVa2	5.569	1.259	agree	-0.568	-0.037	pass
51	Increase in market value of my company has been met during the last fiscal year.	MarketVa3	5.519	1.210	agree	-0.676	-0.301	pass

Table 4.2 Descriptive statistical data for Firm Performance and its manifest observing variables **(Continue)**

	Growth	Gro	5.573	1.020	agree			
	In my company, Growth on net profit earnings from the business over the past five years was satisfactory.	Growt1	5.703	1.211	agree	-0.792	-0.003	pass
49	My company's growth in turnover/sales from the business over the past five years is significantly positive.	Growt2	5.459	1.131	somewhat agree	-0.433	-0.567	pass
48	My company interested in long-term growth, but have occasional concerns about fluctuation	Growt3	5.498	1.109	agree	-0.556	-0.259	pass
	Profitability	Prof	5.638	1.072	agree	-0.633	-0.333	pass

Table 4.2 Descriptive statistical data for Firm Performance and its manifest observing variables **(Continue)**

47	In my company, Improvement in Return on Assets (ROA) from the business is met according to the estimation.	Prof1	5.538	1.177	agree	-0.513	-0.514	pass
46	In my company, Improvement in Return on Investment (ROI) from our business is assured.	Prof2	5.612	1.137	agree	-0.575	-0.445	pass
45	In my company, Improvement in Return on Sales (ROS) from our business is assured.	Profi3	5.713	1.201	agree	-0.634	-0.520	pass

From Table 4.12 the Firm performance components averaged from 5.309 – 5.713 and the standard deviation ranges from 1.020- 1.259, with the highest mean for observing variable being Growt1 (mean = 5.703). The lowest mean variable is MarketVa1 (mean = 5.309) Skewness and Kurtosis were shown to be negative and it was found that the distribution characteristics of all observing variables in this component to have the passing criteria.

Table 4.3 show descriptive statistical data for control system and its manifest observing variables:

Table 4.3 Descriptive statistical data for Control System and its manifest observing variables

No	**Variables**	**Symbol**	**Mean**	**S.D**	**Remarks**	**Skewness**	**Kurtosis**	**Remark**
	Control and Information System	CIS	5.693	0.937	agree			
44	My company's level of performance is required to achieve each of the areas defined in setting the goals.	CISyst1	5.612	1.047	agree	-0.546	0.029	pass
43	My organization uses processes to evaluate individual, group and organizational performance.	CISyst2	5.703	1.045	agree	-0.638	0.159	pass

Table 4.3 Descriptive statistical data for Control System and its manifest observing variables **(Continue)**

42	My company adopts key performance indicators related to the goals and success factors of the strategic plan.	CISyst3	5.754	1.043	agree	-0.780	0.404	pass
41	I believe that the existing structure allows adopting the system of performance evaluation that affects or is affected by Strategic Planning.	CISyst4	5.703	1.024	agree	-0.566	0.141	pass
	Operating Compliance	OC	5.632	1.083	agree			

Table 4.3 Descriptive statistical data for Control System and its manifest observing variables **(Continue)**

40	I know the mission and vision stated in the strategic plan of the institution since they are widely disseminated and presented to managers and employees.	Opcom1		1.170	agree	-0.788	0.445	pass
39	I received in formal character the strategic plan implemented in the organization through direct communication by the senior management of the company.	Opcom2	5.653	1.153	agree	-0.933	0.968	pass

Table 4.3 Descriptive statistical data for Control System and its manifest observing variables **(Continue)**

38	My company's control system adopts the organization processes and activities that it deemed necessary to ensure its success	Opcome3	5.684	1.130	agree	-1.110	1.529	pass
	Capabilities	Cap	5.624		agree			
37	I know the activities and processes required to ensure the success of the strategic plan adopted by the organization.	Capa1	5.624	1.123	agree	-0.987	1.259	pass

Table 4.3 Descriptive statistical data for Control System and its manifest observing variables **(Continue)**

36	I know the goals that are believed as the future success of the firm since they are widely distributed and presented to managers and employees.	Capa2	5.610	1.092	agree	-0.877	0.783	pass
35	I pay attention to the main factors that are believed as essential to the success of organization in the future.	Capa3	5.639	1.051	agree	-0.794	1.270	pass
34	Mission of the organization is tied with the Information System and it is to the attention of managers and employees.	Capa4		1.055	agree	-0.558	-0.096	pass

From Table 4.3 it was found that the control system components were averaged from 5.754–5.610 and has a standard deviation ranging from 1.024 - 1.170, with the highest mean variable CISyst3 (mean=5.754) followed by CISyst4 (mean= 5.703), and the variable with the lowest mean was Capa2 (mean= 5.610). When considering the skewness, it was found that the distribution characteristics of the variable data in this component all have negative skewness, and within the acceptable range. Regarding kurtosis, indicating a normal distribution of the data, which is According to the acceptable range.According to Hair et al. (2010), Bryne (2010) and Kline (2011) argued that data is considered to be normal if skewness is between -2 to +2 and kurtosis is between -7 to +7 for the samples population of more than 300.

Table 4.4 Descriptive statistical data for Technological Innovation and its manifest observing variables

No	**Observing Variables Indicators**	**Symbol**	**Mean**	**S.D**	**Remark**	**Skewness**	**Kurtosis**	**Remark**
	Technology Productivity	TPr	5.652	1.078	agree			
33	Information technology increases my company's ability to anticipate customer needs.	TechPro1	5.639	1.184	agree	-0.682	-0.258	pass

Table 4.4 Descriptive statistical data for Technological Innovation and its manifest observing variables **(Continue)**

32	Information technology assists my company in serving new market segments.	Techpro2	5. 663	1.158	agree	-0.795	0.184	pass
31	My company uses information technology to improve the levels of production through control process.	Techpro3	5.653	1.158	agree	-0.740	-0.085	pass
	Technology reliability	TRe	5.553	1.007	agree			
30	Technologically, the devices we utilize do function as they are manufactured with latest innovation.	Techrelib 1	5.531	1.142	agree	-0.601	-0.356	pass

Table 4.4 Descriptive statistical data for Technological Innovation and its manifest observing variables **(Continue)**

29	For my company, the innovative devices are reliable that the staff can trust on with confident.	Techrelib 2	5.562	1.156	agree	-0.775	0.219	pass
28	Technological software is reliable enough to succeed the system.	Techrelib3	5.598	1.166	agree	-0.663	-0.035	pass
27	The innovative software technology is reliable for my mining company to develop and expand rapidly.	Techrelib 4	5.519	1.106	agree	-0.620	-0.003	pass
	Technology Efficiency	TEf	5.576	0.991	agree			

Table 4.4 Descriptive statistical data for Technological Innovation and its manifest observing variables **(Continue)**

26	My company uses information technology to improve the productivity of labor through automation.	Techeffic1	5.589	1.135	agree	-0.744	0.360	pass
25	My company is using more innovative technologies than the majority of its competitors.	Techeffic2	5.577	1.110	agree	-0.765	0.351	pass
24	My company is more efficient than the majority of its competitors.	Techeffic3	5.573	1.137	agree	-0.733	0.275	pass

From Table 4.4 it was found that the observing variables of technological innovation indicator, average from 5.519– 5.663 and has a standard deviation of 1.106 - 1.166, with the highest mean Techpro2 (mean = 5.663), followed by Techpro1 (mean= 5.639) and the lowest mean variable was Techrelib 4 (mean=5.519). Regarding Skewness and kurtosis, it was found that distribution of all observed variables are within the acceptance range and indicating normal distribution of data.

Table 4.5 Descriptive statistical data for Social Factor and its manifest observing variables

Table 4.5 Descriptive statistical data for Social Factor and its manifest observing variables **(Continue)**

No	**Observing Variables Indicators**	**Symbol**	**Mean**	**S.D**	**Remark**	**Skewness**	**Kurtosis**	**Remark**
	Operator Proficiency	OP	5.665	1.005	agree			
23	I believe the employees are being supportive in solving technical issues in the control system process.	Socialatt4	5.720	1.106	agree	-0.837	0.751	pass
22	I try to be interested in what my colleagues share with me as a solution, strategy, or technological approach	Socialatt3	5.617	1.094	agree	-0.517	-0.049	pass
21	My colleagues are helpful when I need them to figure out the situation regarding an innovative issue in the company.	Socialatt2	5.658	1.121	agree	-0.755	0.651	pass
20	My colleagues are effective in encouraging the management team toward applying technical advanced software.	Socialatt1	5.653	1.104		-0.568	-0.033	pass

Table 4.5 Descriptive statistical data for Social Factor and its manifest observing variables **(Continue)**

	Social Attitude	SA	5.669	0.947	agree			
19	In my opinion, it matters to anticipate global trends in the light of endorsing company's norms and values.	Traine4	5.670	1.053	agree	-0.658	0.221	pass
18	In my company, it's important to look at the "big picture" of Company's goals, rather than the individual department's needs.	Traine3	5.679	1.111	agree	-0.837	0.513	pass
17	In my company, it matters the most to understand the costs, profits, markets, and added value of the department and how those contribute to the success of Company.	Traine2	5.711	1.121	agree	-0.889	0.902	pass

Table 4.5 Descriptive statistical data for Social Factor and its manifest observing variables **(Continue)**

16	In my company, we consider aligning resources to meet the technological business advances and control process of the Company.	Traine1 es1	5.670	1.076	agree	-0.837	0.751	pass
	Training Needs	TN	5.678	0.986				
15	Each mining operator must undergo an "operator proficiency check" every once a while to demonstrate his or her competence in carrying out normal, abnormal and emergency procedures.	Operprof3	5.567	1.071	agree	-0.861	1.033	pass
14	I believe that an Operator Proficiency Check must be conducted by a Type Rating Examiner (TRE) to respect the technological standards.	Operprof2	5.653	1.016	agree	-0.788	0.668	pass

Table 4.5 Descriptive statistical data for Social Factor and its manifest observing variables **(Continue)**

13	Having Line proficiency checks (LPCs) which are carried out by Line Training Captains (suitably qualified commanders) can help the company significantly.	Operprof1	5.684	1.046	agree	-0.743	0.307	pass
	Operator Proficiency	OP	5.665	1.005	agree			

From Table 4.5 the Social Factor components averaged from 5.617– 5.720 and standard deviation ranging from 1.046 - 1.121, with the highest mean for observing variable being Socialatt4 (mean= 5.720), followed by traine2 (mean=5.711) and the observing variable with the lowest mean was Socialatt3 (mean= 5.617). Skewness were shown to be negative and found that the distribution characteristics of observing variables fall within the acceptance range indicating normal distribution of data. According to Hair et al. (2010), Bryne (2010) and Kline (2011) argued that data is considered to be normal if skewness is between -2 to +2 and kurtosis is between -7 to +7 for the samples population of more than 300.

Table 4.6 Descriptive statistical data for Organization Environment and its manifest observing variables

No	**Observing Variables Indicators**	**Symbol**	**Mean**	**S.D**	**Remarks**	**Skewness**	**Kurtosis**	**Remark**
	Organizational Safety	EnS	5.667	0.977	agree			

Table 4.6 Descriptive statistical data for Organization Environment and its manifest observing variables **(Continue)**

12	My company has an environmental action plan outlining key actions and targets for the current year.	envisafety1	5.620	1.044	agree	-0.536	-0.240	pass
11	My logistics safety is compliant with internationally recognized systems such as ISO 14001 or EMAS.	envisafety2	5.689	1.010	agree	-0.538	-0.245	pass
10	Having an Environmental Management System is necessary for my mining company.	envisafety3	5.694	1.102	agree	-0.623	-0.293	pass
9	Safety management at my Company is a priority.	envisafety4	5.409	1.141	somewhat agree	-0.568	-0.033	pass
	Environmental Dynamism	EnD	5.684	0.942	agree			

Table 4.6 Descriptive statistical data for Organization Environment and its manifest observing variables **(Continue)**

8	My company follows to setup a dynamic environment through innovation and technologies	envidynamism1	5.670	1.035	agree	-0.611	0.222	pass
7	My company follows the local technological dynamism rather than international technological standards.	envidynamism2	5.648	1.043	agree	-0.597	-0.017	pass
6	In my company, the machinery accuracy degree is high.	envidynamism3	5.734	1.068	agree	-0.701	0.453	pass
5	My company business unit consistently change its practices to keep up with cutting edge innovations	Envidynamism4	5.632	1.181	agree	-0.663	-0.035	pass
	Environmental Comfort	EnC	5.662	0.907	agree			
4	I believe that my organization needs an Intensity of environmental changes to upgrade our technical control process.	envicomfort1	5.689	1.084	agree	-0.539	-0.254	pass

Table 4.6 Descriptive statistical data for Organization Environment and its manifest observing variables **(Continue)**

3	My organization has a safe work environment due to applying innovative means.	envicomfort2	5.648	0.981	agree	-0.780	1.221	pass
2	Overall, I find my work environment comfortable for the personnel due to using the advanced technology.	envicomfort3	5.648	0.949	agree	-0.635	0.708	pass
1	My employer's work environment must be positive in a direction so that they can add more creativity at work.	Envicomfort4	5.687	1.153	agree	-0.788	0.668	pass

Table 4.6 shows the mean of the 12 observed variables in the organization environment latent variable which ranges from 5.734 to 5.409 and standard deviation ranging from 0.981 to 1.181. The highest mean for observing variable being envidynamism3 (mean= 5.720), followed by envisafety3 (mean=5.694) and the observing variable with the lowest mean is Envisafety4 (mean= 5.409). Skewness and kurtosis for distribution characteristics of observing variables fall within the acceptance range indicating normal distribution of data. According to Hair et al. (2010), that data is considered to be normal if skewness is between −2 to +2 and kurtosis is between −7 to +7 for the samples population of more than 300.

4.3 Research Measurement Model

The measurement model Structural Equation Model (SEM) comprises of the goodness of Fit (GoF) analysis that determines whether the model corresponds to empirical data or not (Confirmatory Factor Analysis: CFA) for the five latent variables in the research model such as 1) Organization Environment (OE), 2) Social Factor (SF), 3) Technological Innovation (TI), 4) Control System (CS) and 5) Firm Performance (FP) with their respective observed variables, analysis of regression weight of each questionnaire item, factor loading analysis, validity test, and reliability test. Confirmatory factor analysis (CFA) is used for testing the research measurement model. Confirm a key factor analysis is a statistical technique used to verify the factors structure of a set of observed variables. CFA allows the researcher to test the hypothesis that the relationship between observing variables are in the line with latent constructs and test the hypothesis statistically.

4.3.1 Validity and Reliability Test

Validity is the degree to which the construct of interest is portrayed correctly by an item or collection of items .How well items describe the structure is a concern for validity .Confirmatory factor analysis to assess the validity of a measurement model CFA is investigated. Confirmatory factor analysis (CFA), correlation coefficient and indicating factors for measurement model are explained in details in the following sections. The measuring model's reliability is how consistent a set of elements are in what it aims to measure (Nunnally, 1978; Hair et al., 1998; Nunnally & Bernstein, 1994). The most common measurement in Cronbach's alpha represents the confidence of several items .As discussed in chapter 3, the assessment of construct reliability was conducted by examining the Cronbach’s alpha coefficient of each construct (factor). Based Cronbach’s alpha test result, it has been suggested that each construct has good reliability because their Cronbach’s alpha coefficient values were higher than 0.8, which considered to be high reliability. Each construct has an acceptable degree of reliability for goldmining firm performance sample (see APPENDIX E).The rules of thumb for both Cronbach’s alpha and composite reliability should be above 0.7 (Nunnally, 1978; Hair et al., 1998; Nunnally & Bernstein, 1994; Bacon et al. 1995).

4.3.2 Chi Square Goodness of Fit

Model fitness and interpretation of the model fit to the data need to be tested once estimated. This is a contentious Structural Equation Model (SEM) issue, similar to the sample size .There are multiple indices available for the evaluation of the model is referred to in the discussions by Shankar (2019)on the debate on "precise versus close fit ". The study by Parthiban & Gajivaradhan (2020) shows that the popular perspective taken by social scientists represents the belief that approximating the data observed is appropriate and can lead to important literature contributions(Cooper, 2015) proposed researchers report various indexes, which several have adopted of the overall model fit. GFI, μ2 GFI Absolute fit indicators tests explicitly how well the model is consistent with the observed data . The goodness-of-fit index GFI, μ2, and Scaled β2 are absolute fit measures.

Thus, the model does not match the sample data with a large β2. Although the most frequently recorded absolute fit index is -2, there are two constraints. Next, this mathematical analysis checks whether the model matches the data exactly. The other issue is that, as with most statistics, large sample sizes increase strength, with small effect sizes resulting in importance (Lore, 2016). Therefore, a no significant 2, although the model may match closely with the observed data, may be impossible. Despite these constraints, scientists report β2 almost uniformly (Franke, Ho, & Christie, 2012), which provides a way of verifying, as demonstrate, if two models vary in their data fit. Researchers usually consider additional fit measures to assess if the model fits.

Following guidelines from Quessy, Rivest, & Toupin (2019), three additional indices for the model μ2 were introduced, including the 90% confidence interval (90% CI) and the 90% Standardized R, Comparative Fit Index (CFI). An example of a gradual fit index is Quessy, Rivest, & Toupin (2019) CFI. This form of index measures the change in the researcher's model fit against the independence or null model, which does not define any relations between variables. CFI varies between 0 and 1.0, with values nearer to 1.0 that suggest better suitability. The RMSEA (LoRe, 2016) is also proposed as a fit index. For the difficulty of a model, this index was corrected. In this way, the simpler model has a more desirable RMSEA value if two models describe the observed data equally well.

4.3.3 RMSEA Value

RMSEA is an absolute fit index, in that it assesses how far a hypothesized model is from a perfect model and matches the data. On the contrary, CFI and TLI are incremental fit indices that compare the fit of a hypothesized model with that of a baseline model. A covariance is used in the Standardized Root Mean Square Residual (SRMR) index Franke, Ho, & Christie (2012), where smaller values are more fitting. SRMR describes how far the observed data and the model vary from each other. The true correlation, which leads to error, is greater than the model. The SRMR represents the absolute mean between the associations that have been observed and the model. A mean of null does not imply a difference between the observed data and the correlations of the model; an SRMR of .00, therefore, demonstrates perfect fitness. Regardless of whether researchers decide to report the index, researchers should analyze standard residues used as an output to recognize the associations that do not appear in the estimated model in the observed results.

Although many still follow these guidelines (as demonstrated by a positive assessment of fitting index models on or around these values), readers should be aware that debate about the appropriate fit between statisticians (and probably between reviewers) does occur. Howell (2011) has suggested, that the required cut-off values are influenced by the sample size, the model complexity, and the extent of misspecification. Inappropriately using the new cut-off criterion, this study shows that suitable models can be rejected incorrectly when sampled sizes are less than N = 500 and models are not complex.

8

4.3.4 Firm Performance Correlation Coefficient Result

Table 4.7 presents the correlation of between each pair of firm performance observed variables. It was found that the correlations between the 12 pairs in 3 observed variables were statistically and significantly different from zero at 0.01 and they were in a range of 0.615 and 0.837 which fell in all acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998). The lowest correlation is the correlation between the Profit3 and growt3 (0.615) while the highest correlation is the correlation between Profit1 and Profit2 (0.599).

Table 4.7 Correlation Coefficient between Pairs of Firm Performance Observed Variables

Variables	MarketVal1	MarketVa2	MarketVa3	Growt1	Growt2	Growt3	Profitability1	Profitability2	Profitability3
MarketVal1	1								
MarketVa2	.746**	1							
MarketVa3	.782**	.769**	1						
Growt1	.694**	.657**	.745**	1					
Growt2	.653**	.708**	.744**	.669**	1				
Growt3	.650**	.695**	.707**	.653**	.783**	1			
Profitability1	.649**	.660**	.723**	.649**	.660**	.656**	1		
Profitability2	.672**	.677**	.728**	.702**	.642**	.629**	.806**	1	
Profitability3	.675**	.649**	.708**	.723**	.644**	.615**	.742**	.837**	1

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

Table 4.8 the model fit indices of Firm Performance

The model fit indices	Acceptance levels	Statistical Values (before adjustment)	Statistical Values (after adjustment)
Relative Chi-Square (χ^2/df)	< 2.00	5.192	1.873
CFI	> 0.90	0.958	0.993
NFI	> 0.90	0.949	0.985
IFI	> 0.90	0.958	0.993
RMSEA	< 0.05	0.100	0.046
RMR	< 0.05	0.043	0.023
		Lack of Fit	Acceptable Model Fit

Table 4.8 and Figure 4.1 show the consistent statistical measure of the Confirmatory Factor Analysis model in relation to the research hypotheses and the data on the firm performance. Some statistics of goodness of fit did not pass certain criteria such as RMSEA (0.100) and Relative Chi-Square (5.192). Therefore, the research model needed adjustment so that it fits the empirical data relying on theoretical reasons and modification indices. The model was adjusted by estimating certain parameters in observed variables which reflected weak factor loading and through modification indices and after adjustment all the factors fill within the acceptance range for model fit. This approach followed the modification of CFA in similar manner.

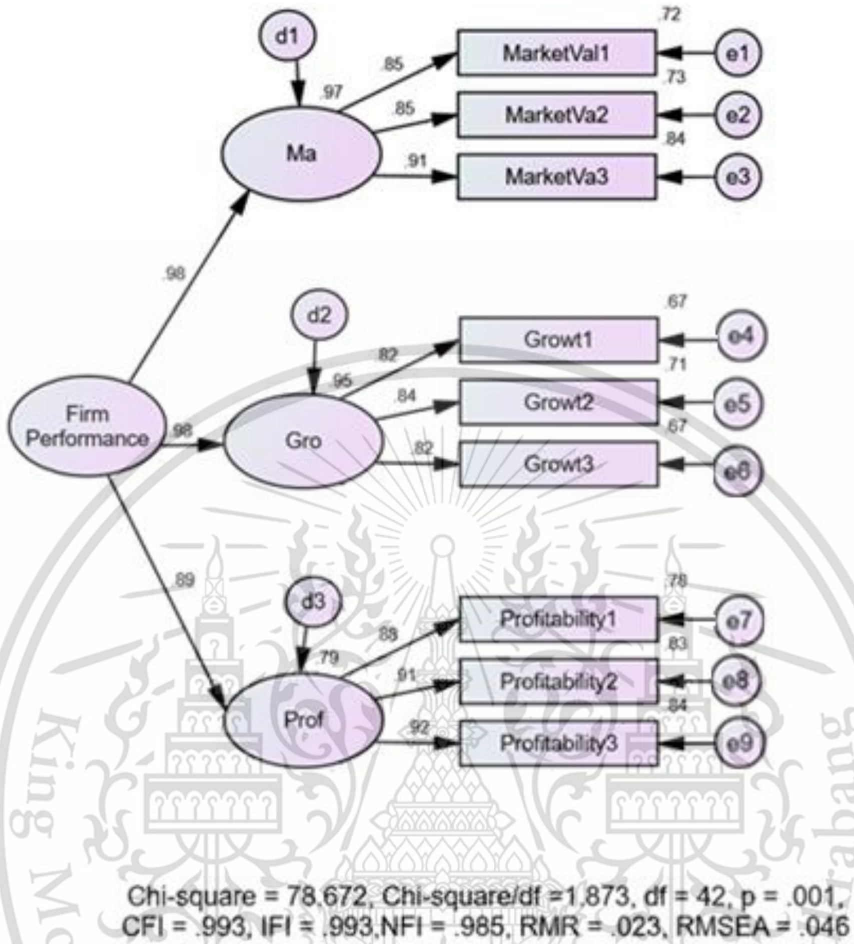

Figure 4.1 Confirmatory Factor Analysis Model in Firm Performance.

Table 4.9 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Firm Performance)

Observe Variables		Variable	Factor Loading	S.E.	C.R.	P	CR	AVE
Ma	<---	Firm Performance	0.983	0.052	19.813	***	0.96	0.90
Gro	<---	Firm Performance	0.977	0.048	19.172	***		
Prof	<---	Firm Performance	0.886	0.046	19.044	***		
MarketVal1	<---	Ma	0.851	0.048	22.556	***	0.89	0.66

Table 4.9 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Firm Performance) **(Continue)**

Observe Variables		Variable	Factor Loading	S.E.	C.R.	P	CR	AVE
MarketVa2	<---	Ma	0.854	0.041	22.556	***		
MarketVa3	<---	Ma	0.914	0.042	25.502	***		
Growt1	<---	Gro	0.821	0.051	20.407	***	0.87	0.62
Growt2	<---	Gro	0.84	0.047	20.407	***		
Growt3	<---	Gro	0.819	0.047	19.613	***		
Profit1	<---	Prof	0.881	0.037	27.483	***	0.92	0.75
Profit2	<---	Prof	0.908	0.036	27.483	***		
Profit3	<---	Prof	0.918	0.044	24.391	***		

Table 4.9 presents Factor Loading, Composite Reliability of latent variables (CR), and Component Variance, which indicate the measurements of Confirmatory Factor Analysis of firm performance with high composite reliability (CR) of 0.96 and average variance extracted (AVE) of 0.90, above the reported levels of 0.60 suggested by Fornell and Larcker (1981) and Hair etl (2010). Factor Loading range between 0.886 to 0.983 with the highest for market value 0.983 and the lowest for profitability 0.886.

4.3.5 Technological Innovation Correlation Coefficient Result

Table 4.10 presents the correlation of between each pair of firm performance observed variables. It was found that the correlations between the 10 pairs of observed variables were statistically and significantly different from zero at 0.01 and they were in a range of 0.625 and 0.811 which fell in all acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998) the lowest correlation is the correlation between the Techreliab4 and Techpro2 (0.615) while the highest correlation is the correlation between Techeffic2 and Techeffic1 (0.811)

Table 4.10 Correlation Coefficient between Pairs of Technological Innovation Observed Variables

Variables	Technology Productivit1	Technology Productivit2	Technology Productivit3	Technology Reliabilit1	Technology Reliabilit2	Technology Reliabilit3	Technology Reliabilit4	Technology Efficienc1	Technology Efficienc2	Technology Efficienc3
TechnologyProductivit1	1									
TechnologyProductivit2	.780**	1								
TechnologyProductivit3	.780**	.785**	1							
TechnologyReliabilit1	.708**	.719**	.760**	1						
TechnologyReliabilit2	.675**	.683**	.704**	.742**	1					
TechnologyReliabilit3	.684**	.661**	.679**	.683**	.644**	1				
TechnologyReliabilit4	.664**	.625**	.688**	.688**	.642**	.822**	1			
TechnologyEfficienc1	.685**	.660**	.669**	.678**	.661**	.767**	.766**	1		
TechnologyEfficienc2	.708**	.694**	.716**	.694**	.636**	.750**	.759**	.811**	1	
TechnologyEfficienc3	.674**	.657**	.693**	.669**	.671**	.733**	.713**	.795**	.808**	1

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

175

Table 11 The model fit indices of Technological Innovation

The model fit indices	Acceptance levels	Statistical Values (before adjustment)	Statistical Values (after adjustment)
Relative Chi-Square (χ^2/df)	< 2.00	4.991	1.369
CFI	> 0.90	0.963	0.997
NFI	> 0.90	0.955	0.990
IFI	> 0.90	0.963	0.997
RMSEA	< 0.05	0.098	0.030
RMR	< 0.05	0.040 Lack of Fit	0.015 Acceptable Model Fit

Table.11 and Figure 4.2 show the consistent statistical measure of the Confirmatory Factor Analysis model in relation to the research hypotheses and the data on the technological innovation. Some statistics of goodness of fit did not pass certain criteria such as Relative Chi-Square (4.991) and RMSEA (0.098). Therefore, the research model needed adjustment so that it fits the empirical data relying on theoretical reasons and modification indices. The model was adjusted through modification indices and by estimating certain parameters in observed variables which reflected weak factor loading and through modification indices all the factors fit within the acceptance range.

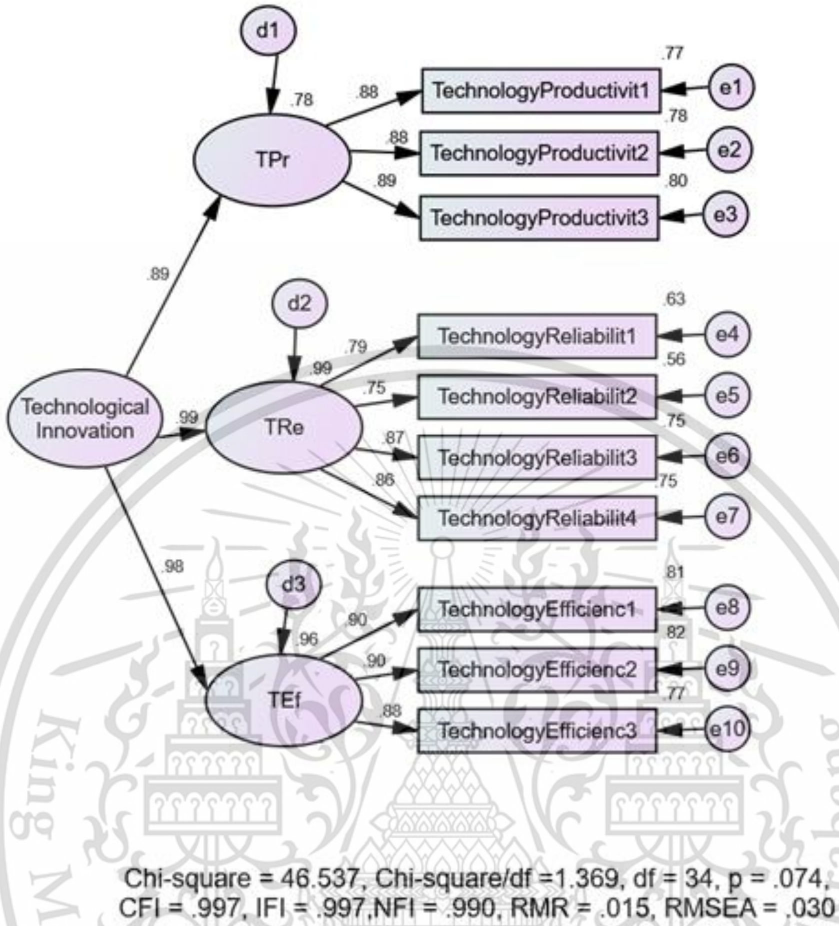

Figure 4.2 Confirmatory Factor Analysis Model in Technological Innovation.

Table 4.12 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Technological Innovation)

Observe Variables		Variables	Factor Loading	S.E.	C.R.	P	CR	AVE
TPr	<---	Technological Innovation	0.886	0.055	19.094	***	0.97	0.91
TRe	<---	Technological Innovation	0.994	0.047	20.832	***		

Table 4.12 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Technological Innovation) (Continue)

TEf	<---	Technological Innovation	0.979	0.054	19.993	***		
TechnologyProductivit1	<---	TPr	0.879	0.04	25.177	***	0.89	0.72
TechnologyProductivit2	<---	TPr	0.881	0.039	25.177	***		
TechnologyProductivit3	<---	TPr	0.893	0.038	25.85	***		
TechnologyReliabilit1	<---	TRe	0.791	0.05	20.913	***	0.86	0.61
TechnologyReliabilit2	<---	TRe	0.747	0.046	20.913	***		
TechnologyReliabilit3	<---	TRe	0.866	0.056	20.024	***		
TechnologyReliabilit4	<---	TRe	0.864	0.053	19.978	***		
TechnologyEfficienc1	<---	TEf	0.899	0.035	28.677	***	0.90	0.70
TechnologyEfficienc2	<---	TEf	0.904	0.034	28.677	***		
TechnologyEfficienc3	<---	TEf	0.879	0.037	26.797	***		

Table 4.12 presents Factor Loading, Composite Reliability (CR) and average variance derived (AVE) and Component Variance, which indicate the measurements of Confirmatory Factor Analysis, with high composite reliability (CR) of 0.97 and average variance extracted (AVE) of 0.91, above the reported levels of 0.60 suggested by Fornell and Larcker (1981) and Hair etl (2010). The average variance extracted (AVE) a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. Factor loading range between 0.994 to 0.979 with the highest for technological reliability 0.994 and the lowest for technological efficiency 0.979.

4.3.6 Social factor Correlation Coefficient Result

Table 4.13 presents the correlation of between each pair of social factor observed variables. It was found that the correlations between the 11 pairs in 3 observed variables were statistically and significantly different from zero at 0.01 and they were in a range of 0.536 and 0.804 which fell in all acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998). The lowest correlation is the correlation between the Socialatt4 and Traine2 (0.536) while the highest is the correlation between Traine2 and Traine1 (0.5804).

Table 4.13 Correlation Coefficient between Pairs of Social Factor Observed Variables

Variables	Operator Proficienc1	Operator Proficienc2	Operator Proficienc3	Training Need1	Training Need2	Training Need3	Training Need4	Social Attitudes1	Social Attitudes2	Social Attitudes3	Social Attitudes4
OperatorProficienc1	1										
OperatorProficienc2	.720**	1									
OperatorProficienc3	.737**	.756**	1								
TrainingNeed1	.729**	.742**	.774**	1							
TrainingNeed2	.738**	.725**	.780**	.804**	1						
TrainingNeed3	.651**	.722**	.705**	.773**	.763**	1					
TrainingNeed4	.686**	.681**	.643**	.705**	.729**	.676**	1				
SocialAttitudes1	.678**	.667**	.666**	.733**	.740**	.670**	.706**	1			
SocialAttitudes2	.681**	.659**	.634**	.700**	.701**	.707**	.756**	.730**	1		
SocialAttitudes3	.634**	.672**	.649**	.694**	.674**	.625**	.652**	.720**	.736**	1	
SocialAttitudes4	.580**	.603**	.586**	.612**	.536**	.648**	.649**	.599**	.668**	.645**	1

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

180

Table 4.14 The model fit indices of Social Factor

The model fit indices	Acceptance levels	Statistical Values (before adjustment)	Statistical Values (after adjustment)
Relative Chi-Square (χ^2/df)	< 2.00	3.620	1.583
CFI	> 0.90	0.979	0.996
NFI	> 0.90	0.971	0.989
IFI	> 0.90	0.979	0.996
RMSEA	< 0.05	0.079	0.037
RMR	< 0.05	0.025	0.016
		Lack of Fit	Acceptable Model Fit

Table 4.14 and Figure 4.3 show the consistent statistical measure of the Confirmatory Factor Analysis model in relation to the research hypotheses and the data on the social factor. Some statistics of goodness of fit did not pass certain criteria such as Relative Chi-Square (3.620) and RMSEA (0.079). Therefore, the research model needed adjustment so that it fits the empirical data relying on theoretical reasons and modification indices. The model was adjusted through modification indices by estimating certain parameters in observed variables which reflected weak factor loading and after adjustment, all the factors fit within the acceptance range.

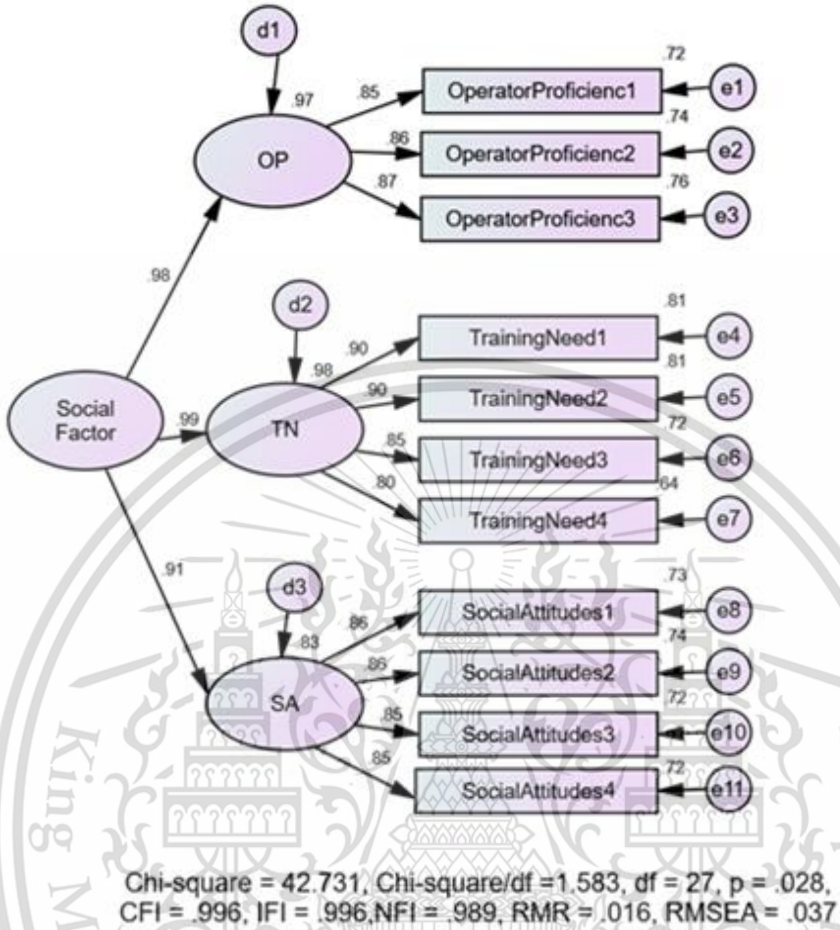

Figure 4.3 Confirmatory Factor Analysis Model in Social Factor.

Table 4.15 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Social Factor)

Observe Variables		Variables	Factor Loading	S.E.	C.R.	P	CR	AVE
OP	<---	Social_Factor	0.982	0.041	22.712	***	0.98	0.93
TN	<---	Social_Factor	0.988	0.048	22.071	***		
SA	<---	Social_Factor	0.910	0.049	18.53	***		
OperatorProficienc1	<---	OP	0.846	0.045	22.462	***	0.87	0.70

Table 4.15 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Social Factor) (continue)

OperatorProficienc2	<---	OP	0.858	0.044	22.462	***		
OperatorProficienc3	<---	OP	0.873	0.044	23.158	***		
TrainingNeed1	<---	TN	0.898	0.035	28.417	***	0.91	0.71
TrainingNeed2	<---	TN	0.899	0.036	28.417	***		
TrainingNeed3	<---	TN	0.847	0.038	24.747	***		
TrainingNeed4	<---	TN	0.801	0.039	22.082	***		
SocialAttitudes1	<---	SA	0.856	0.046	22.168	***	0.88	0.71
SocialAttitudes2	<---	SA	0.861	0.044	22.168	***		
SocialAttitudes3	<---	SA	0.848	0.043	21.613	***		
SocialAttitudes4	<---	SA	0.846	0.056	20.024	***		

Table 4.15 presents Factor Loading, Composite Reliability of latent variables (CR) and average variance derived (AVE) and Component Variance, which indicate the measurements of Confirmatory Factor Analysis, with high composite reliability (CR) of 0.98 and average variance extracted (AVE) of 0.93, above the reported levels of 0.60 suggested by Fornell and Larcker (1981) and Hair etl (2010). The average variance extracted (AVE) a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. Factor Loading range between 0.910 to 0.998 with the highest for training need 0.998 and the lowest for social attitude 0.910.

4.3.7 Control System Correlation Coefficient Result

Table 4.16 presents the correlation of between each pair of control system observed variables. It was found that the correlations between the 11 pairs of observed variables were statistically and significantly different from zero at 0.01 and they were in a range of 0.538 and 0.858 which fell in all acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998). The lowest correlation is the correlation between the capabilities4 to control and information system2 (0.538) while the highest, is the correlation between Operating compliance3 and operating compliance 2 (0.858). Table 4.26 reveals that there are no problems with multicollinearity among the different constructs. Regarding the multicollinearity test, suggesting that any pair of measured variables with the correlation value higher than r = 0.90 implies a potential problem (Hair et al., 1998).

Table 4.16 Correlation Coefficient between Pairs of Control System Observed Variables

Variables	Control and Information System1	Control and Information System2	Control and Information System3	Control and Information System4	Operating Compliance1	Operating Compliance2	Operating Compliance3	Capabilities1	Capabilities2	Capabilities3	Capabilities4
Control and InformationSystem1	1										
Control and InformationSystem2	.699**	1									
Control and InformationSystem3	.731**	.756**	1								
Control and InformationSystem4	.749**	.767**	.796**	1							
OperatingCompliance1	.572**	.549**	.561**	.583**	1						
OperatingCompliance2	.613**	.595**	.619**	.660**	.831**	1					
OperatingCompliance3	.575**	.571**	.630**	.632**	.794**	.858**	1				
Capabilities1	.598**	.569**	.590**	.633**	.756**	.814**	.810**	1			
Capabilities2	.564**	.613**	.625**	.623**	.724**	.766**	.780**	.803**	1		
Capabilities3	.600**	.621**	.625**	.662**	.642**	.714**	.708**	.675**	.679**	1	
Capabilities4	.600**	.538**	.620**	.620**	.632**	.689**	.659**	.630**	.649**	.777**	1

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

185

Table 4.17 The model fit indices of Control System

The model fit indices	Acceptance levels	Statistical Values (before adjustment)	Statistical Values (after adjustment)
Relative Chi-Square (χ^2/df)	< 2.00	4.991	1.686
CFI	> 0.90	0.963	0.995
NFI	> 0.90	0.955	0.987
IFI	> 0.90	0.963	0.995
RMSEA	< 0.05	0.098	0.041
RMR	< 0.05	0.040 Lack of Fit	0.016 Acceptable Model Fit

Table 4.17 and Figure 4.4 show the consistent statistical measure of the Confirmatory Factor Analysis model in relation to the research hypotheses and the data on the social factor. Some statistics of goodness of fit did not pass certain criteria such as Relative Chi-Square (4.991). Therefore, the research model needed adjustment so that it fits the empirical data relying on theoretical reasons and modification indices. The model was adjusted by estimating certain parameters and items in observed variables that reflected weak factor loading and through modification indices after adjustment all the factors fit within the acceptance range for model fit.

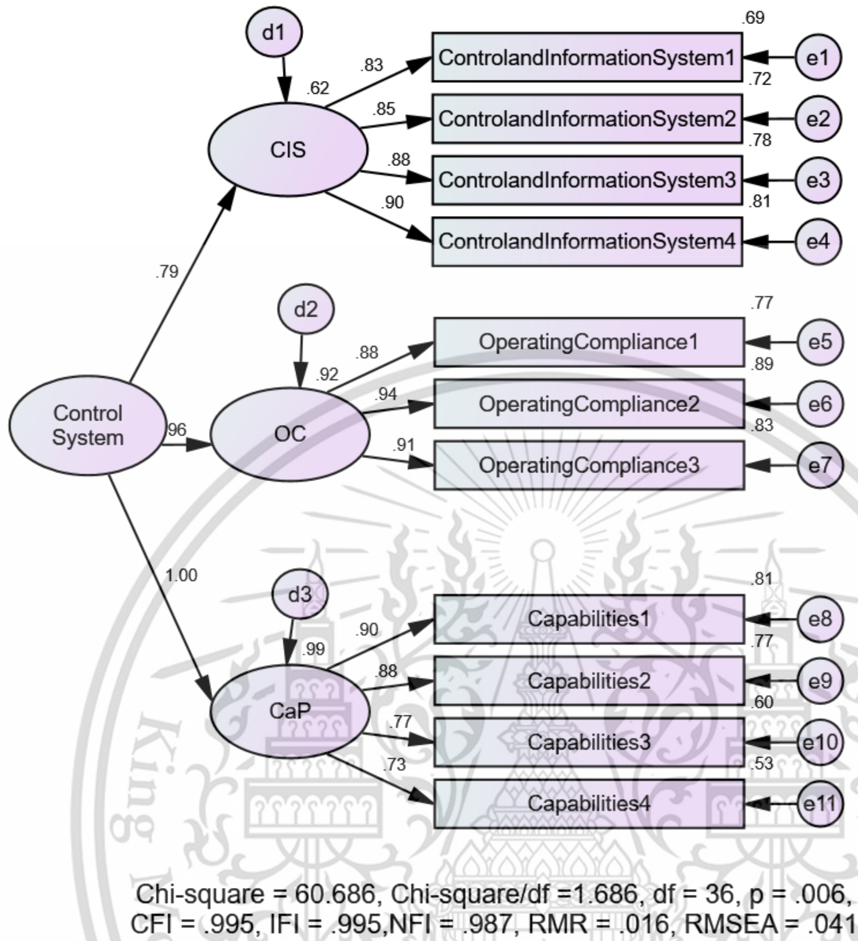

Figure 4.4 Confirmatory Factor Analysis Model in Control System.

Table 18 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Control System)

Observe Variables		Variables	Factor Loading	S.E.	C.R.	P	CR	AVE
CIS	<---	Control_System	0.787	0.039	17.056	***	0.95	0.87
CaP	<---	Control_System	0.996	0.089	16.451	***		
OC	<---	Control_System	0.957	0.091	15.683	***		
Control Information System1	<---	CIS	0.831	0.046	21.34	***	0.92	0.74

Table 18 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Control System) (continue)

Control Information System2	<---	CIS	0.85	0.048	21.34	***		
Control Information System3	<---	CIS	0.882	0.047	22.655	***		
Control Information System4	<---	CIS	0.902	0.045	23.473	***		
OperatingCompliance1	<---	OC	0.877	0.032	29.8	***	0.92	0.79
OperatingCompliance2	<---	OC	0.945	0.036	29.8	***		
OperatingCompliance3	<---	OC	0.909	0.037	27.225	***		
Capabilities1	<---	CaP	0.901	0.04	26.557	***	0.88	0.65
Capabilities2	<---	CaP	0.876	0.036	26.557	***		
Capabilities3	<---	CaP	0.773	0.039	20.606	***		
Capabilities4	<---	CaP	0.731	0.041	18.742	***		

Table 4.18 presents Factor Loading, Composite Reliability (CR) and average variance derived (AVE) and Component Variance, which indicate the measurements of Confirmatory Factor Analysis, with high composite reliability (CR) of 0.95 and average variance extracted (AVE) of 0.87, above the reported levels of 0.60 suggested by Fornell and Larcker (1981) and Hair etl (2010). The average variance extracted (AVE) is a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. The average variance extracted (AVE) a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. Factor Loading range between 0.787 to 0.996 with the highest for capabilities 0.996 and the lowest for control and information system 0.787.

4.3.7 Organization Environment Correlation Coefficient Result

Table 4.19 presents the correlation of between each pair of organization environment observed variables. It was found that the correlations between the 12 pairs in 3 observed variables were statistically and significantly different from zero at 0.01 and they were in a range of 0.825 and 0.616 which fell in all acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998). The lowest correlation is the correlation between the Environmental comfort2 and Environmental dynamism3 (0.616) while the highest, is the correlation between Environmental comfort2 and Environmental comfort4 (0.825). Table 4.19 reveals that there are no problems with multicollinearity among the different constructs as multicollinearity test, suggest that any pair of measured variables with the correlation value higher than r = 0.90 implies a potential problem (Hair et al., 1998).

Table 4.19 Correlation Coefficient between Pairs of Organization Environment Observed Variables

Variables	envisafety 1	envisafety 2	envisafety 3	envisafety 4	envidynamis 1	envidynamism 2	envidynamism 3	envicomfort 4	envicomfort 1	envicomfort 2	envicomfort 3	Envicomfort 4
envisafety1	1											
envisafety2	.786**	1										
envisafety3	.774**	.821**	1									
Envisafety4	.659**	.685**	.749**	1								
envidynamism1	.729**	.702**	.805**	.768**	1							
envidynamism2	.679**	.725**	.766**	.630**	.672**	1						
envidynamism3	.604**	.679**	.678**	.637**	.678**	.777**	1					
envidynamism4	.648**	.675**	.727**	.673**	.673**	.727**	.710**	1				
envicomfort1	.675**	.724**	.761**	.699**	.663**	.814**	.784**	.728**	1			
envicomfort2	.653**	.659**	.696**	.732**	.648**	.676**	.616**	.726**	.707**	1		
envicomfort3	.673**	.689**	.688**	.700**	.636**	.680**	.701**	.729**	.710**	.753**	1	
envicomfort4	.651**	.647**	.733**	.686**	.738**	.644**	.652**	.724**	.756**	.784**	.825**	1

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

190

Table 4.20 The model fit indices of Organizational Environment

The model fit indices	Acceptance levels	Statistical Values (before adjustment)	Statistical Values (after adjustment)
Relative Chi-Square (χ^2/df)	< 2.00	9.701	1.830
CFI	> 0.90	0.943	0.997
NFI	> 0.90	0.937	0.994
IFI	> 0.90	0.943	0.997
RMSEA	< 0.05	0.144	0.045
RMR	< 0.05	0.037 Lack of Fit	0.015 Acceptable Model Fit

Table 4.20 and figure 4.5 show the consistent statistical measure of the Confirmatory Factor Analysis model in relation to the research hypotheses and the data on the social factor. Some statistics of goodness of fit did not pass certain criteria such as Relative Chi-Square (9.701) and RMSEA (0.144). Therefore, the research model needed adjustment so that it fits the empirical data relying on theoretical reasons and modification indices. The model was adjusted by estimating certain parameters and items in observed variables which reflected weak factor loading and through modification indices, after adjustment all the factors fit within the acceptance range for model fit.

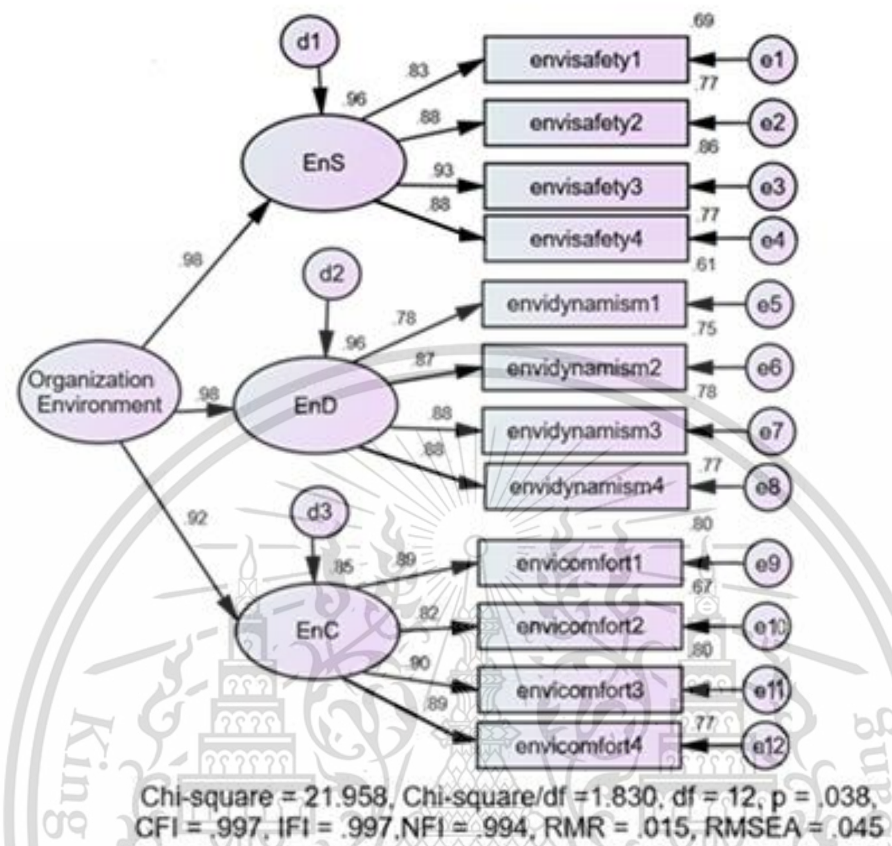

Figure 4.5 Confirmatory Factor Analysis Model in Organization Environment

Table. 4.21 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Organizational Environment)

Observe Variables		Variables	Factor Loading	S.E.	C.R.	P	CR	AVE
EnS	<---	Organizational Environment	0.978	0.046	21.205	***	0.98	0.94
EnD	<---	Organizational Environment	0.979	0.047	19.932	***		
EnC	<---	Organizational Environment	0.921	0.043	19.668	***		
envisafety1	<---	EnS	0.833	0.038	25.756	***	0.91	0.76

Table. 4.21 Internal consistency and convergent validity for the measurement items of the constructs (Factor Loading CR AVE of Organizational Environment) (Continue)

envisafety2	<---	EnS	0.878	0.040	25.756	***		
envisafety3	<---	EnS	0.929	0.041	27.824	***		
envisafety4	<---	EnS	0.876	0.036	26.557	***		
envidynamism1	<---	EnD	0.779	0.047	19.101	***	0.87	0.69
envidynamism2	<---	EnD	0.866	0.059	19.101	***		
envidynamism3	<---	EnD	0.883	0.045	22.985	***		
envidynamism4	<---	EnD	0.879	0.037	20.302	***		
envicomfort1	<---	EnC	0.894	0.058	20.771	***	0.90	0.76
envicomfort2	<---	EnC	0.819	0.040	20.771	***		
envicomfort3	<---	EnC	0.896	0.050	21.079	***		
envicomfort4	<---	EnC	0.888	0.039	22.558	***		

Table 4.21 presents Factor Loading, Composite Reliability (CR) and average variance derived (AVE) and Component Variance, which indicate the measurements of Confirmatory Factor Analysis, with high composite reliability (CR) of 0.98 and average variance extracted (AVE) of 0.94, above the reported levels of 0.60 suggested by Fornell and Larcker (1981) and Hair etl (2010). The average variance extracted (AVE) a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error. Factor loading range between 0.921 to 0.979 with the highest for environmental dynamism 0.979 and the lowest for environmental comfort 0.921.

4.4 Structural Model and Hypothesis Testing

Table 4.22 presents the correlation of between each pair of research model observed variables. It was found that the correlations between the 15 pairs of observed variables were statistically and significantly different from zero at 0.01 and they were in a range of .876 to .664 all within acceptable criteria and passed the preliminary assumption of multicollinearity. This is because they were found to be less than 0.90 (Hair, Anderson, Tatham, & Black 1998; Hinkle, 1998) and reveals that there are no problems with multicollinearity among the different constructs. Regarding the multicollinearity test, suggesting that any pair of measured variables with the correlation value higher than r = 0.90 implies a potential problem (Hair et al., 1998). The correlation table reveals that there are no problems with multicollinearity among the different construct

Table. 4.22 Correlation Coefficient between Pairs of Research Model Observed Variables

Variables	Ma	Gro	Prof	TPr	TRe	TEf	OP	TN	SA	CIS	OC	Cap	EnS	EnD	EnC
Ma	1														
Gro	.875**	1													
Prof	.837**	.840**	1												
TPr	.810**	.838**	.871**	1											
TRe	.809**	.832**	.816**	.844**	1										
TEf	.787**	.779**	.791**	.804**	.872**	1									
OP	.700**	.701**	.695**	.702**	.735**	.821**	1								
TN	.727**	.699**	.730**	.702**	.740**	.823**	.876**	1							
SA	.684**	.667**	.662**	.656**	.736**	.768**	.803**	.857**	1						
CIS	.698**	.679**	.693**	.656**	.737**	.772**	.806**	.840**	.836**	1					
OC	.734**	.752**	.781**	.803**	.784**	.802**	.708**	.726**	.698**	.703**	1				
Cap	.747**	.771**	.760**	.776**	.814**	.832**	.774**	.787**	.754**	.763**	.875**	1			
EnS	.710**	.751**	.763**	.744**	.754**	.753**	.679**	.722**	.706**	.730**	.753**	.811**	1		
EnD	.664**	.698**	.713**	.697**	.727**	.745**	.704**	.745**	.700**	.732**	.703**	.799**	.849**	1	
EnC	.669**	.684**	.701**	.669**	.699**	.702**	.678**	.745**	.702**	.723**	.678**	.750**	.826**	.855**	1

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

The researcher analyzed the structural equation model synthesized from theories and concepts of this research model in order to examine the goodness of fit between the research model and the empirical evidences and to test the research hypotheses after CFA models was audited. The initial research model did not fit to empirical data as shown in following figure 4.6.

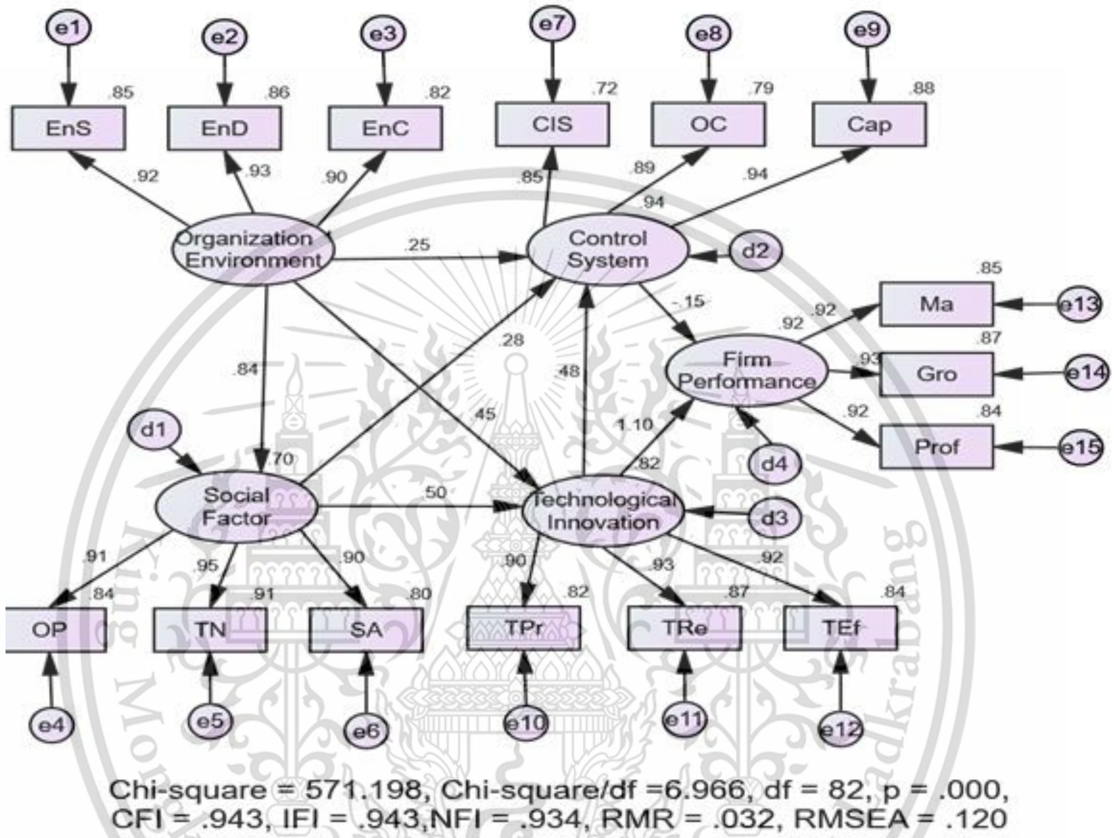

Figure 4.6 The Initial Research Model (before adjustment)

Table 4.23 The model fit indices of Structural model (before adjustment)

The model fit indices	Acceptance levels	Data-model fit results (before adjustment)	
Relative Chi-Square (χ^2/df)	< 2.00	6.966	Not Pass
CFI	> 0.90	0.943	Pass
NFI	> 0.90	0.934	Pass
IFI	> 0.90	0.943	Pass

Table 4.23 The model fit indices of Structural model (before adjustment) (Continue)

RMSEA	< 0.08	0.120	Not Pass
RMR	< 0.05	0.032	Pass
		Lack of Fit	

Some statistics of goodness of fit did not pass certain criteria such as RMSEA (0.120) and Relative Chi-Square (6.966). However, chi-square statistics is very sensitive to sample fluctuation and RMSEA for model fit indication. It is more appropriated to further look at other fit measure (Mulaik 2007). Fortunately, other fit measures indicated the goodness of fit of the model RMR = 0.032, IFI = 0.934, CFI = 0.943 and NFI = 0.943 (see Table 3.7 SEM Statistical Criteria for Research Model**)**. According to Bollen (1989) CFI-indices above 0.9 indicate good fit to the model. In addition, CFI shows the value (0.943) which could be indicated as a good fit to the model (Schumacker & Lomax, 2010).

Therefore, the research model needed modification so that it fits the empirical data relying on theoretical reasons and modification indices. In AMOS, the modification indices (M.I.) indicated that certain latent variables were required to be related (correlated) and certain error covariances also needed to be correlated to improve fit of the model to the data (see APPENDIX D). The model was adjusted by through modification indices suggested that exogenous and mediating variables influenced on endogenous variable by freeing certain items in observed variables which reflect weak regression weights (see regression weights table in APPENDIX D) then the modified research model, fits the empirical data this approach. Therefore, after the revised measurement model was tested with a sample as recommended by Thompson (2000), it produced a good fit of the data to the model after showing directive paths and correlating covariances were drawn. The modified research model is depicted in the following figure and table.

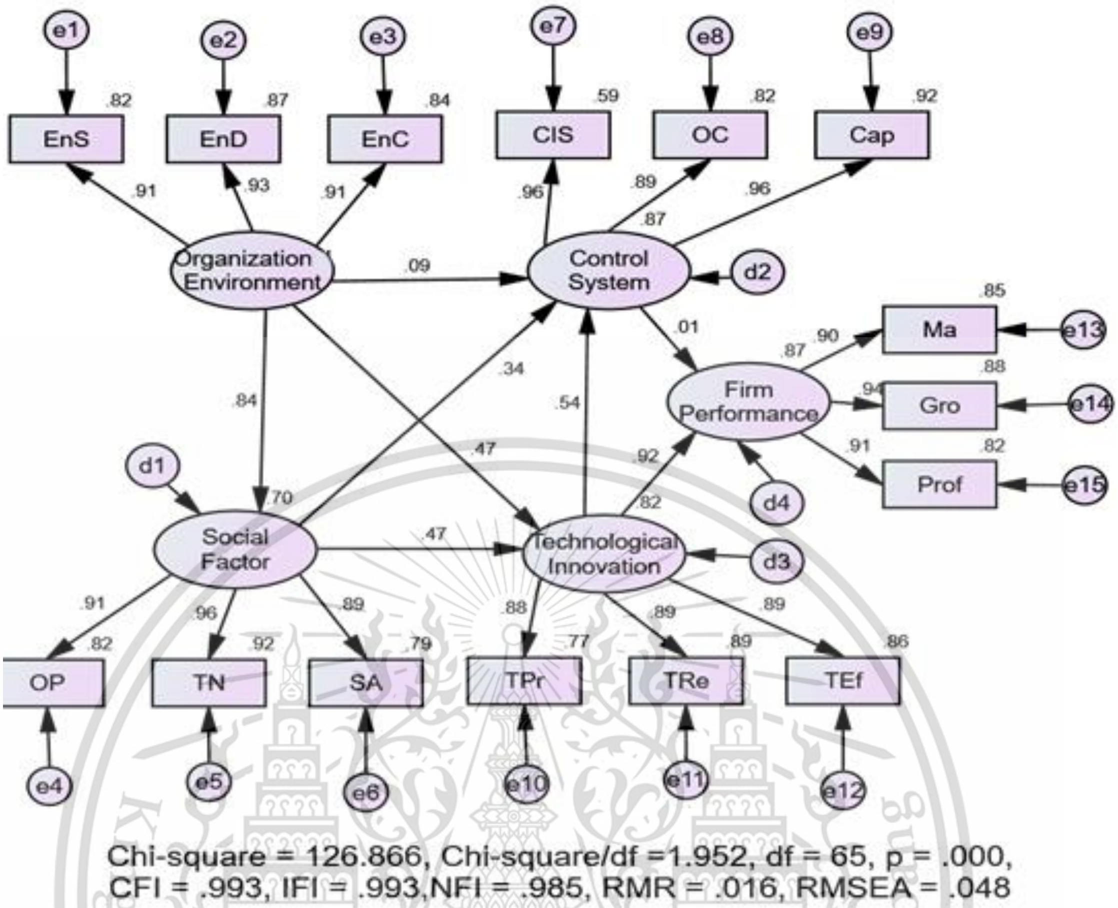

Figure 4.7 The Modified Research Model (after adjustment)

Table 4.24 The model fit indices of Structural model (after adjustment)

The model fit indices	Acceptance levels	Data-model fit results (After adjustment)	
Relative Chi-Square (χ^2/df)	< 2.00	1.952	Pass
CFI	> 0.90	0.993	Pass
NFI	> 0.90	0.985	Pass
IFI	> 0.90	0.993	Pass
RMSEA	< 0.08	0.048	Pass
RMR	< 0.05	0.016	Pass
		Acceptable Model Fit	

As shown in table 4.24, all factors fall within the acceptance range therefore it confirms the model fit. Fit measures indicated the goodness of fit of the model RMR = 0.016, IFI = 0.993, CFI = 0.993 and NFI = 0.985 show good fit within the accepted measurement criteria.

Table 4.25 Discriminant Validity and Reliability for the Measurement Constructs

Construct	**CR**	**AVE**	R^2	Firm Performance	Technological Innovation	Social Factor	Control System	Organization Environment
Firm Performance	0.96	0.90	0.872	0.947				
Technological Innovation	0.97	0.91	0.820	0.930	0.952			
Social Factor	0.98	0.93	0.705	0.443	0.473	0.966		
Control System	0.95	0.87	0.866	0.011	0.539	0.598	0.931	
Organization Environment	0.98	0.94	0.000	0.811	0.868	0.840	0.842	0.971

Note: Value in main diagonal calculated from $\sqrt{AVE}$

Table 4.25 presents Factor Loading, Composite Reliability (CR) average variance derived (AVE) and Component Variance, which indicate the measurements construct with high composite reliability (CR) average variance extracted (AVE) are above the required levels of 0.60 suggested by Fornell and Larcker (1981) and coefficient of determination indicate strong correlations between variables according to Hair etl. (2010). The average variance extracted (AVE) a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error.

Table 4.26 Effect of Antecedent Variables toward Endogenous Variable

	Total Effects OE	Direct & Indirect Effects	Total Effects SF	Direct & Indirect Effects	Total Effects TI	Direct & Indirect Effects	Total Effects CS	Direct & Indirect Effects	Total Effects FP	Direct & Indirect Effects

Table 4.26 Effect of Antecedent Variables toward Endogenous Variable (continue)

SF	0.84	0.84	0	0	0	0	0		0	
		0		0		0		0		0
TI	0.868	0.472	0.473	0.473	0	0	0		0	
		0.397		0		0		0		0
CS	0.842	0.086	0.598	0.343	0.539	0.539	0		0	
		0.756		0.255		0		0		0
FP	0.811	0	0.443	0	0.930	0.924	0.011	0.011	0	
		0.811		0.443		0.006		0		0

According to the results of Table 4.26, organization environment has a direct effect on social factor (0.84) and organization environment has a direct effect (0.472) and indirect effect (0.397) on technological innovation and the total effects of organization environment to technological innovation is positive and significant, this implies the importance of organization environment and comfort toward implementing technological productivity, efficiency and system reliability for the organization. Organization environment has a direct positive but insignificant effect (0.086) to control system and has a significant indirect effect (0.756) to control system. Organization environment has a significant indirect effect (0.811) to firm performance. Social factor has a significant direct effect (0.473) to technological innovation and social factor has a direct effect (0.343) and indirect effect of (0.255) on control system. This implies the importance of employees' proficiency and training need toward information and control system as well as technological innovation and productivity and social factor has an indirect effect (0.443) on firm performance. Technological innovation has a direct significant effect (0.924) and an indirect insignificant effect (0.006) on firm performance, this implies the importance of technological innovation and implementation toward effecting firm performance. Control system has a direct insignificant effect (0.011) on firm performance. The total effects of Technological innovation is positive and significant toward firm performance and control system, which reflect on importance of technological progress and innovation toward control system and enhancing firm performance financially. Control system total effects toward firm performance is not significant which implies and further shows no significant support for the relation between control system and firm performance, in addition, control system compliance allows the company to achieve a high level of success in operations by incorporating different strategies in new ways within organizations. Control system is a significant driver of operation performance but not necessarily financial performance as referred by (Younis, Sundarakani, & Vel, 2016). According to the results, organization environment relation to social factor and to technological innovation suggest the most significant factors to influence firm performance, this implies the significance of organizational safety and comfort for the employees and managers along with the importance employees proficiency and training needs and emphasize the prominence of technological productivity, system reliability and innovation as major factors to influence firm performance, while organization environment relation to control system to firm performance is not significant toward gold mining firm performance in Eastern African Community.

4.4.1 Hypothesis Test Result

After assessing the fit of the structural model is performed, as shown in table 4.27 all hypotheses are supported except for Hypothesis 2 and 8 which show the effect of organization environment to control system (0.086) and the effect of control system on firm performance (0.01) of east African gold mining companies. The highest path coefficient is between technological innovation to firm performance (0.924), followed by organization environment to social factor (0.840) and social factor to technological innovation (0.473).

Table 4.27 Hypotheses Testing Results (H1 – H8)

Hypothesis	Path			Path coefficients (beta weight)	S.E.	C.R.	testing results
H1	Organization Environment	→	Social Factor	0.840***	0.038	20.659	Supported
H2	Organization Environment	→	Control System	0.086	0.049	1.772	Unsupported
H3	Organization Environment	→	Technological Innovation	0.472***	0.053	8.879	Supported

Table 4.27 Hypotheses Testing Results (H1 – H8) (Continue)

H4	Social Factor	→	Technological Innovation	0.473***	0.059	8.329	Supported
H5	Social Factor	→	Control System	0.343***	0.05	7.296	Supported
H6	Technological Innovation	→	Control System	0.539***	0.062	8.935	Supported
H7	Technological Innovation	→	Firm Performance	0.924***	0.075	13.779	Supported
H8	Control System	→	Firm Performance	0.011	0.068	0.169	Unsupported

Note: * statistically significant level at 0.001 (p-value < 0.001)**

Table 4.27 presents the outcome of the hypothesis testing. It was found that:

H1: The statistically significant path of organization environment supported social factor with the coefficient (beta weight) of (0.840).

H2: The path of organization environment to control system statistically insignificant and unsupported with coefficient (beta weight) of (0.086).

H3: The statistically significant path of organization environment supported technological innovation with coefficient (beta weight) of (0.472).

H4: The statistically significant path of social factor supported technological innovation with coefficient (beta weight) of (0.473).

H5: The statistically significant path of social factor supported control system with coefficient (beta weight) of (0.343).

H6: The statistically significant path of technological innovation supported control system with coefficient (beta weight) of (0.539).

H7: The statistically significant path of technological innovation supported firm performance with coefficient (beta weight) of (0.924).

H8: The path of control system to firm performance statistically insignificant and unsupported with coefficient (beta weight) of (0.011).

CHAPTER 5

CONCLUSION AND DISCUSSION

This research investigated and established a conceptual model for the gold mining firm performance in EAC. This chapter concludes the study results and provides the following recommendations on analysis of results and discussions of research questions, and hypotheses test results analysis discussions and implications and recommendations. The results of this investigation show that the model is ideal for the observed data. The results and discussions in this chapter are managerial implications, theoretical contributions. In conclusion, there is a consideration on the limitation of this study and recommendations for future researches. This chapter consist of the following topics.

5.1 Conclusion, Research Objective and Research Questions
5.2 Analysis of Results, Hypothesis and Discussion
5.3 Managerial Implications and Theoretical Implication
5.4 Limitations, Recommendation, and Future Research

5.1 Conclusion, Research Objective and Research Questions

The objective of this research is to develop and investigate an SEM of variables affecting gold mining firm financial performance in Eastern African Community. The variables include Organization Environment (OE), Social Factor (SF), Technological Innovation (TI), and Control System (CS) on measuring Firm Performance (FP). This study used a quantitative approach by distributing questionnaires to respondents responsible for executive positions in gold mining firms in east Africa, the positions include vice president, sales manager, chief executive officer (CEO), chief finance officer (CFO), chief human resource officer, operational executives from 65 companies selected based on stratified random sampling with the sample size of 390 managers among across 6 countries in EAC. The responses to questions were on a 7 Likert scale. The

Cronbach's Alpha Coefficient of the questionnaire test set is Cronbach alpha is 0.989, which is above the criterion of 0.70.

Technological adoption along with sufficient structural organization for Gold mining firms result in increasing profitability growth and market value and therefore, success in financial performance, social and environmental output (Stahl, Brewster, Collings, & Hajro, 2020). The proposed model was developed using the stakeholder theory, the dynamic capabilities theory and inspired by resource-based view and structural contingency theory (Schechner, 2004; Walker & Caprar, 2020; Aryee, Walumbwa, Seidu, & Otaye, 2016). This analysis used a basic on the e-mailing questionnaires collect random sampling method top managers of gold mining companies. The scales of this investigation are mainly focused on previous scales and exploratory studies that have been conducted, including questionnaires.

According to the results of Table 4.26, Organization environment has a direct effect on social factor (0.84) and organization environment has a direct effect (0.472) and indirect effect (0.397) on technological innovation, this implies the importance of organization environment comfort, safety and dynamism on influencing toward technological productivity, efficiency and system reliability for the organization. Organization environment has a direct positive but insignificant effect (0.086) to control system and has a significant indirect effect (0.756) to control system. Organization environment has a significant indirect effect (0.811) to firm performance this implies the importance of organization environment and comfort toward improving firm performance. Social factor has a significant direct effect (0.473) to technological innovation and social factor has a direct effect (0.343) and indirect effect of (0.255) on control system. This implies the importance of employees' proficiency and training need toward information and control system as well as technological innovation and productivity and social factor has an indirect effect (0.443) on firm performance. Technological innovation has a direct significant effect (0.924) and an indirect insignificant effect (0.006) on firm performance, the results show that technological innovation contribute substantially to the performance and success of the organization. Control system has a direct insignificant effect (0.011) on firm performance. This implies in goldmining industry control system is not a significant factor to improve firm performance financially while in service sector, it significantly influence firm performance (Houpis, Rasmussen, & Garcia-Sanz, 2018).

According to the results, organization environment relation to social factor and to technological innovation suggest the highest statistically significant path to influence firm performance, this implies the significance of organizational safety and comfort for the employees and managers along with the importance of employees proficiency and training needs and emphasize the prominence of technological productivity, system reliability and innovation as major factors to influence goldmining firm performance in Eastern African Community.

The dissertation focused on important questions:

1. How do organization environment, social factor through mediating variables of technological innovation and control system affect performance of gold mining firms in Eastern African Community?

2. What are the applicable factors in relation to firm performance concepts for gold mining companies in Eastern African Community?

3. How is the structural equation model of variables that is consistent with empirical research data of gold mining practices affect firm performance financially in Eastern African Community?

The summary of the results confirmed the relationship between variables as presented in hypothesis tests are in line with conceptual framework and theoretical model fits and consistent.

Conceptual and statistical results emphasize that variables of this study influence firm performance with financial metrics. The applicable factors include emphasizing on a dynamic organizational environment for the employees, their proficiencies and training needs, and applying an efficient technological innovation and system reliability to increase firm performance financially. Furthermore, the results confirm the importance of organization dynamic environment, employee's training needs and attitude, operator proficiency along with technological productivity, reliability and efficiency on firm performance. The summary of the model result confirms the relationship between variables as presented in hypothesis tests and conceptual framework and all research questions can be answered theoretically as well as statistically.

This study offers a good picture of the relationship between firm performance factors according to stakeholder theory, theory of dynamic capabilities, resource based-view and contingency theory. Stakeholder theory in approach to firm performance includes factors such as are the profit and growth and market value which are applicable to gold mining firm performance in Eastern African Community. The other significant factors include the importance of dynamic organization environment, having a comfortable and safe working environment supported by contingency theory for the employees and increasing employees proficiency and training needs to be able to adopt and effectively practice new technologies and be able to cope with firm vision and strategies toward increasing firm performance (Tigabu, Berkhout, & van Beukering, 2015).

After assessing the fit of the structural model is performed, as shown in table 5.1 all hypotheses are supported except Hypothesis (2) which show the effect of organization environment to control system (0.086) of east African gold mining companies and Hypothesis (8) which show the effect of control system to firm performance (0.011). Organization environment effect to social factor (0.840) and technological innovation to social factor (0.473) and technological innovation significant effect (0.924) to firm performance, offer the highest statistically significant path to influence gold mining firm performance in Eastern African Community. These hypotheses (H1, H4, H7) can be applied to answer research questions I, II and III. In addition, this emphasize the importance of stakeholder theory and dynamic capabilities perspective attempt to understand factors influenced firm performance through innovation and technologies (Prahalad and Hamel, 1994; Hamel and Prahalad, 1994; Gatignon and Xuereb, 1997) while structural contingency theory argues that organization contingency is depend on structural fitting within an organization which include items such as safety, diversification, comfort, dynamic environment, the theory suggest that if the structure fit well toward contingencies then it results in higher performance in comparison to if structure doesn't fit well then it results in low performance (Donaldson, 2001). This also highlight the importance of exogenous variable, organization environment to influence performance through mediating variables.

According to the findings, technological innovation and its characteristic which include system reliability, technological productivity and efficiency emphasize as the most influential factors to influence firm performance in Eastern African Community. Below is a summary of results statistical support:

Table 5.1 Summary of results

Hypothesis	**Statistical Support**
Hypothesis 1. Organization Environment Affects Social Factors of	Supported

Table 5.1 Summary of results **(Continue)**

East African Gold Mining Companies.	
Hypothesis 2. Organization Environment Affects Control System of East African Gold Mining Companies.	Unsupported
Hypothesis 3. Organization Environment Affects Technological Innovation of East African Gold Mining Companies.	Supported
Hypothesis 4. Social Factor Affects Technological Innovation of East African Gold Mining Companies.	Supported
Hypothesis 5. Social Factor Affects Control System of East African Gold Mining Companies.	Supported
Hypothesis 6. Technological Innovation Affects control system of East African Gold Mining Companies.	Supported
Hypothesis 7. Technological Innovation Affects Firm performance of East African Gold Mining Companies.	Supported
Hypothesis 8. Control System Affects Firm Performance of East African Gold Mining Companies.	Unsupported

5.2 Analysis of Results, Hypothesis and Discussion

The conceptual model for this study is derived from the literature review. In doing so, the researcher had determined 8 hypotheses. The hypothesis test results provide new insight into the relationship between variables. The results show positive relations between variables. Each of the hypotheses results and details are shown in chapter 4.

This study explored the effects and relations of organization environment to social factor through mediating factors of technological innovation and control system on gold mining firm performance within the Eastern African community. According to Kennedy, Whiteman, & van den Ende (2017) environmental safety and dynamism contribute to gaining valuable capital to configure sustainable development and then deliver high efficiency in increasing organization performance while technological innovation and its characteristic which include technological innovation, production and reliability significantly influence firm performance (Hakala and Kohtamaki, 2011).

The hypothesis results are summarized below:

Hypothesis 1. Organization Environment Affects Social Factor of East African Gold Mining Companies.

Hypothesis 2. Organization Environment Affects Control System of East African Gold Mining Companies.

Hypothesis 3. Organization Environment Affects Technological Innovation of East African Gold Mining Companies.

The results confirmed there is a positive effect of organization environment on Social Factor (H1), the estimated coefficient (beta weight) is equal to (0.840) which is large effect size (0.5 <r < 1.0 Cohen, 1988). This is reinforced by several studies that have examined the direct effect of organization environment on social factors (Uzkurt, Kumar, Kimzan, & Eminoglu, 2013) as an attempt to test the model based on empirical evidence for a developing economy. According to the result, the effect of organization environment on control system (H2) is not significant as the estimated coefficient (beta weight) is equal to (0.086), which doesn’t support the required effect size and further shows no significant support for organization environment relation to control system for goldmining firm performance in eastern African community but contrary to this, other studies in service sector endorse organizations efficiency positive relation to firm control system in developing countries (Camisón, & Villar-López, 2014). Furthermore, Shin, Sung, Choi, & Kim (2015), in their research, confirmed that an innovation in business could attain its target of positioning itself sustainably in a turbulent market and outperforming competitors. In addition, the organization must stimulate its curiosity, promote the decision-making process and increase its capacity to face environmental changes (Rizvi and Garg, 2021). This study endorses organization environment indirectly influence control system.

In addition, this research also explores the theme of the high echelon theory, which suggests that in terms of results and performance, the role of senior management in organizations is critical (Shin, Sung, Choi, & Kim, 2015). Organization environment affects technological innovation of East African Gold Mining Companies (H3), the estimated coefficient (beta weight) is equal to (0.472) which is a medium effect size (0.3 <r < 0.5 Cohen, 1988). Epstein, Buhovac, & Yuthas (2015) found that the organization environment makes it possible for businesses to achieve long-term high efficiency. Epstein et al. (2015) further argued that sustainable practices depend on employees’ skills, attitudes, and training needs to effectively use new technologies. Managers are also strongly urged to increase in safe organization environment and implement technologies because it can make an essential contribution to competitive success (Zhang, Khan, Lee, & Salik, 2019).

Hypothesis 4. Social Factor affects Control System of East African Gold Mining Companies.

Hypothesis 5. Social Factor affects Technological Innovation of East African Gold Mining Companies.

The results confirmed there is an effect of social factor on technological innovation (H4), the estimated coefficient (beta weight) is equal to (0.473) which is a medium effect size (0.3 <r < 0.5 Cohen, 1988). This is backed by Zhang, Khan, Lee, & Salik, (2019) who found a direct influence of social factor on control system also indirectly through the mediated factor of technological innovation (H4). Regarding technological innovation, this study's results are consistent with Brynjolfsson, Rock, & Syverson, (2017), who pointed out that employee's knowledge, attitude and training, and improvements to technologies can significantly improve the company's productivity and its financial performance. According to Warren, Moffitt, & Byrnes, (2015), the control system is complicated to adjust, but it can boost firm competitiveness significantly. Control system has been considered a significant factor in improving management, particularly in emerging markets (Tidd, & Bessant, 2020). Similarly, findings have shown, there is a positive relationship between Social Factor and Control System (H5), the estimated coefficient (beta weight) is equal to (0.343) which is medium effect size (0.3 <r < 0.5 Cohen, 1988).This is further supported by Anthony et al. (2015) founding which identified the relationship between skilled employees and control system which leads to improving companies' profitability and competitive advantage in service sectors.

Hypothesis 6. Technological Innovation Affects Control System of East African Gold Mining Companies.

Hypothesis 7. Technological Innovation Affects Firm Performance of East African Gold Mining Companies.

Hypothesis 8. Control system Affects Firm performance of East African Gold Mining Companies.

The results confirmed there is a positive relationship between technological innovation and control system (H6), the estimated coefficient (beta weight) is equal to (0.539) which is a large effect size (0.5 <r < 1.0 Cohen, 1988); this is reinforced by Zhang et al (2016) founding on information technology is critically important in creating a control system for the company to enhance various internal and external organizational processes and systematically improves the firm's value.

Similarly, findings have shown there is a positive relationship between technological innovation and firm performance (H7), the estimated coefficient (beta weight) is equal to (0.924) which is a large effect size ($0.5 < r < 1.0$ Cohen, 1988); furthermore supported by the study of Chen et al. (2015) which discovered, there is a positive relationship between technological innovation and firm performance as technological implementation, upgrades company's system and modernize its operation and increase firm performance. Furthermore, this research emphasize the role of senior management to improve organizational efficiency and profitability through managerial decision making and creative practices. Protogerou, Caloghirou, & Lioukas, (2012) discovered technological innovation significantly influence companies' performance by adopting new technologies, creativity and innovation, which further support (H6) and (H7). This is in line with Chen et al. (2015) who have explored the value of predictors that can boost organizational efficiency through technological innovation. Furthermore, Zhang et al. (2016) suggest that, technological efficiency and compliance substantially improve firm performance. The results have shown there is not a direct significant effect between control system to firm performance (H8), the estimated coefficient (beta weight) is equal to (0.011), which doesn't support the required effect size ($0.5 < r < 1.0$ Cohen, 1988); and further shows no significant support for the relation between control system and firm performance, contrary to this, control system compliance allows the company to achieve a high level of operational success by incorporating different strategies in new ways within organizations for manufacturing sector (Vel, 2016). Control system is a significant driver of operation performance but not necessarily financial performance as referred by (Younis, Sundarakani, & Vel, 2016). Yan, Chong, & Mak (2010) studied a management discretion model which suggests that overall company performance depends on how autonomy, contractual control, and management compensation affect management discretion in International Joint Ventures (IJV) in service sector but also show no significant relations in financial sector. The researchers recognize that the relation between the organizational level of engagement of IJV executives and the use of firm-specific skills tends to improve if executives have the required amount of discretion with the study Information System from 136 IJVs in China.

As summarized in the Table 4-27, it was found that organization environment relation to control system and control system relation to firm performance (H2, H8) were not significant factors toward firm performance. In summary, based on the proposed model as theorized in Chapter 2 (see Figure 2-11) six hypotheses (H1, H3, H4, H5, H6, and H7) were considered significant (see Table 4-27). From this finding, it can be suggested that technological innovation is the most important factor to influence firm performance. The highest statistically significant path are between organization environment relation to social factor and from social factor to technological and from technological innovation toward firm performance as (H1, H4, H7) considered significant factors to influence goldmining firm performance in eastern African community.

There is a substantial positive relationship between information system and firm financial performance in manufacturing sector suggested by (Boiral, 2013). Furthermore, other researchers' sustenance on dynamic capabilities theory demonstrates that a business with special, useful capabilities and resources through technological implementation achieve a lasting competitive position and superior market performance which increases a firm's market value in several sectors including manufacturing, services and information technology (Kuncoro & Suriani, 2018). The summary of results for this model and the test results shows the positive relationships between the variables, as presented in the hypotheses tests and conceptual framework.

5.3 Managerial and Theoretical Implications

This research aims to explore the impact of organization environment and social factor through mediating factors of technological innovation and control system toward gold mining firm performance in EAC. This study has vital implications for the mining managers, policymakers, decision-makers, academicians, and researchers. In developing countries, especially in eastern Africa with deep bureaucratic policies, unsustainable mining practices in various areas and deficiency in gold mining operations affect firm performance and create a gap to fulfill its potential. Furthermore lower gold mining company's financial performance leads to lower investment opportunities which prevent economic growth in the long term for the region.

According to the findings, it can be concluded efficient training for employees, a better working environment, and enhancing technologies and computer software improve firm performance significantly (H1,H4 and H7) which leads to creating better and more investment opportunities that attract more investors to help growth in the economy for the region. The result indicated that the highest path coefficient is between organization environment relation to social factor and to technological innovation toward firm performance supported by stakeholder theory which emphasize the role of top management and stakeholders in decision making and contributing to firm performance while dynamic capability emphasize the mediating role of technologies and innovation in control process, operation and minimizing risk and maximizing organization efficiency, productivity and reliability which lead to increasing sustainable performance. In addition according to Donaldson (2001) structural contingency theory argues that organization contingency is depend on structural fitting within an organization which include items such as safety, diversification, comfort, dynamic environment while contingency theory of leadership emphasize on leader's effectiveness is contingent on whether or not their leadership style and management strategies suits a particular situation which influence firm performance. If the structure fit well toward contingencies then it results in higher performance in comparison to if structure doesn't fit well then it results in low performance. Technological innovation is an important mediating factor between employee social factor and control system toward organization performance based on contingency theory to improve strategic decisions to organization's best interest (Parker et al., 2017). Technological innovation has the highest effect to firm performance (0.924), followed by organization environment to social factor (0.840) and technological innovation on to social factor (0.473) which offers the strongest path coefficient to influence gold mining firm performance in Eastern African Community . Furthermore, this implies on importance of dynamic capabilities theory which demonstrates a business with special, useful capabilities which include technological innovation and resources achieve a lasting competitive position and superior market performance which increases a firm's market value in several sectors including manufacturing, services and information technology but not in precious mineral mining sector industry (Kuncoro & Suriani, 2018). The additional dynamic capability theory emphasize the importance of technological innovation, system reliability and software efficiency and productivity in mobilizing firm-specific resources, creating and capturing values, and transforming them into improving organization performance and the outcome substantially influence organization growth, profitability, and value creation (Teece and Pisano,1994) which is line with findings of this study to emphasize that technological innovation and its characteristic which include system reliability, technological productivity and efficiency emphasize as the most influential factors to influence firm performance in Eastern African Community. Understanding how technological innovation has a mediation role supported by theory of dynamic capability in the relationship between employee's social aspect, training needs and organization environment to control system and firm performance, provides guidelines for management practices in seeking to improve firm performance (Angeles 2014; Rogers 1995; Tornatzky et al. 1990; Djatikusumo, 2014; Ghobakhloo & Hong Tang 2013; Maduku et al. 2016).

In this research stakeholder theory highlights the importance of senior managers in the role of decision making and designing strategies to manage and influence firm performance. Stakeholder theory focuses on how individuals and groups affect the organization as employees' proficiency and training influence how organization sync with its system to achieve superior performance (Freeman,1984). Furthermore, it is demonstrated that the greater the top management support is, the easier it is for an organization to overcome the difficulty and complexity faced by the adoption of new technologies and to applies innovation means to the organization (Bryson, 1995). Stakeholders affect organization outcomes by their interaction, management decision-making toward the firm's organization performance. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. Stakeholders by their proficiency and capabilities influence firm internal control procedures which affect firm's outcome in terms of growth. Stakeholders have power and influence over deciding technologies firms adopt to increase organization performance as stakeholders are affected by the firm's outcome in terms of growth and profitability (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999). According to the balanced scorecard model (BSC), it is vital for firm to have value-added strategies that include stakeholders' interests to achieve organization objectives.

The dynamic capability theory was developed by Teece and Pisano (1994). Dynamic capabilities include employees' skills, training need, their norms and corporate culture, and decision rules that can be employed by firms to create and capture value through a series of technological implementation, innovation, and control procedures that show connections between independent, mediating, and dependent variables of this study. Dynamic capabilities enhance managerial skills, organization culture, and ability to integrate, sync, and reconfigure internal capabilities and procedures to increase firm performance and transform the business environment. The capabilities may stem from change routines, control loop development, and innovative managerial capabilities. They enable the firm to align their distinctive resources/competencies which include employees' proficiency to affect operational procedure through adopting new technologies and internal control system which eventually lead to increased performance within the organization. Capabilities are critical to the long-term profitability of firms (Teece, 2007). The technology-organization-environment theory also known as TOE explain technological innovation implementation and adoption and how implementing technological innovations are influenced by social context, technological context and organization, environmental context. The technological context refers to technologies relevant to firms, both technologies that currently in use and new technologies in market (Collins et al. 1988). Firm existing technologies are important in the process of implementation as a technological innovation has a mediation role empowered by TOE between employees and organization environment to operational control system and firm performance (Kossaï & Piget 2014).

The research model and results provide numerous benefits and recommendations to executive managers and mining practitioners to shape their financial sustainability, internal process, and superior performance policies and strategies. To boost sustainable growth and efficiency, companies prioritize technological innovation and control system rather than conventional methods and mass production processes. It is recommended for gold mining firms to emphasize the adoption of technological innovation and control system on firm performance especially in emerging markets such as South Sudan. The results of this study provide valuable insights into the importance of decision making, management to make reasonable decisions, e.g., investment in technologies, training, and operation rather than expenditure on risky options. In view of the recent trend towards globalization, promoting advanced technologies and efficient control system are essential.

Furthermore, main theories for this research which include dynamic capabilities theory, stakeholder theory, resource-based view and structural contingency theory can be applied to gold mining firms to achieve superior efficiency and recommendations for top executives and stakeholders to enhance better management decision making and strategy development in the organization. This study's findings analyzed that in the East African community's emerging economy, particularly in the gold mining sector, technological innovation and control system are vital for solid company performance and financial growth. Top executives of organizations must emphasize on the technological amendment to significantly boost efficiency in different departments. Furthermore, this study has implications for managers, decision-makers to enhance their understanding of variables affecting firm performance with financial metrics. In addition, managers should advance their strategies to help gain a competitive advantage and increase the firm's market value. Bryson (1995) argued that, in stakeholder theory, organization objective plays an important role in stakeholders' diversity of interest. Robert Kaplan and David Norton developed The Balanced Scorecard (BSC) model in the early 1990s. The balanced scorecard model suggests dynamic environment support valued-added strategies and measurement greatly influence organization value outcome through technological changes and innovation toward firm performance.

The dynamic capability theory focuses on how firms create value for competitiveness in a dynamic environment and use firm resources to create a superior performance (Teece et.al, 1997). The dynamic environment influences the organizational internal system to manage, operate and sync with the overall objective of the firm. According to Lawrence and Lorsch (1967), while structural contingency theory emphasizes firms in a dynamic, changing industry to those in a stable, established industry and found important structural differences. In the stable industry, successful firms relied on formal rules with decision-making very centralized, and narrow spans of supervisory control toward its performance. In the more dynamic industry, spans of control were wider, with less formality and less centralization. In other words, they found that an organization's structure and the environment were contingent on the kind of environment in which it was operating, therefore influencing the organization's control system and operation toward achieving objectives of the organization (Lawrence and Lorsch, 1967). The balanced scorecard (BSC) model examines organization from four major areas to develop an objective measurement for firm performance evaluation and to improve managerial strategies and decision making, which includes financial performance such as profitability, growth and market value, stakeholder which is key stakeholders the organization is designed to serve (David, 1995; Shawn, Andrew, Suresh, & Thomas, 1999).

This study has created a model from both industry and academic perspectives to help decision-makers in the company implement their practices in line with their business objective and improve the firm performance through financial metrics. The study also enhances the academic researcher's understanding on variables affecting firm performance financially in gold mining practices in EAC. This model helps gold mining companies to apply the model and improve their performance. The result has a more significant implication for the Eastern African Community as this region plays a vital role in the global gold mining industry and the world economy.

5.4 Limitations, Recommendations and Future Research

Part of the importance of any research is to realize its limitations (Delon, Ruyter & Lemmink 2004). Although this study has provided relevant and interesting insights into variables which influence goldmining firm performance perspective, concepts and literatures in eastern African community, it is important to recognize its limitations. There are several limitations that need to be identified and reflected in terms of context of this research, the sample chosen, the constructs' measures, and the analytical approach used to perform structural equation modeling (SEM). However, these limitations also present opportunities for future research. Therefore, caution about generalizing the results of research must be taken, as these results reflect firm performance with financial metrics in eastern African community. It is possible that these factors could be significant when applying the models to a different sample and this could be used it to confirm the results of this research. This research is based on top management opinion, it is also possible to measure firm financial performance by exploring financial statements which include balance sheet, revenue, cash flow and stock value to further discover what factors influence firm performance financially. Another important limitation of this thesis is related to the criteria used in selecting the population frame (the sample of this thesis) as the number of available data for precious mineral mining firms are limited in east Africa in comparison to other potential mining regions in the world. However, the results of the study were satisfactory in terms of the standard statistical tests of structural equation modelling and information requirements for analysis of the research questions of the thesis. Future research, thus, can also expand on the present study with other potential regions and countries with varying environments (Chaveesuk, 2010).

This study was conducted during the Covid 19 pandemic, which made the survey collection, communication, level of responsiveness from the companies' executives and the participants challenging. The other significant challenges include, as in the mining industry, the data are susceptible as the nature of business requires secrecies and data protection, affecting the process and data collections techniques. Future research findings could also explore dimensions of firm performance (non-financial efficiency, economic performance, customer performance, competitive performance). Zhang et al. (2016), Jørgensen & Messner. (2010) also argued that creativity in the business model significantly affects competitive advantage and efficiency. This study is limited in terms of measuring firm performance as it's based on senior management opinions on factors influencing gold mining firm performance financially and therefore other aspects of firm financial performance which include firm financial information such as revenue, return on investment, balance sheet, capital investment, require further studies to explore financial aspects in relation and comparison to factors adoption, implementation such as new technologies, control loops and employees proficiency toward measuring firm performance financially. Technological innovation and control system will require ample financial capital; topics such as the potential of capital structure and financial capital are to investigate further to achieve more significant outputs. Various relevant model can be evaluated on various data sets; the production, trade, and service industries can explore separately which type of contributions can significantly increase sustainability and efficiency in the mining industry. Furthermore, the demand for gold is growing rapidly while challenges in the mining industry remain significant as mines are getting exhausted and costly to operate, which impacts the world mining industry, further essential studies into other countries and regions.

Companies involved in the mining sector face numerous challenges, this study shows that having a safe working environment, the right skills and training, and technological advancement are the key factors behind company financial performance. Data gathered and analyzed, conclusions checked, observations, and discussion indicate that the performance of gold mining companies significantly influenced by technological innovation and efficiency. The results emphasize the significance of a dynamic organizational environment for employees and a manager to interact also for firms to adopt efficient control system, innovation, and new technologies to enhance organization sync with its system to improve performance and achieve overall objectives of the firm.

Taking the above results into account, some specific recommendations can be made:

1. Executives should emphasize innovation, creativity, and adopting technologies to gold mining firms in East Africa to increase performance.

2. For technological progress to be encouraged and maximize its potential, firms, in particular mining enterprises, should emphasize employee growth through skill training more effectively.

3. Organizations should follow the proper working environment, framework, organizational structures and adopt value-added strategies to create the appropriate basis for the firm operation and to increase performance.

The future researchers who intend to study this field may include other important regions of Africa as well as global, regional alliances with gold mining potential such as, AEC (ASEAN

Economic Community), and ECO (Economic Cooperation Organization), and the CELAC (The Community of Latin American and the Caribbean States) to further enhance researches and understanding in the managerial practices of the gold mining industry.

REFERENCE

Abdul Basit, S., & Medase, K. (2019). The diversity of knowledge sources and its impact on firm-level innovation. *European Journal of Innovation Management*, 22(No. 4), 681–714.

Abiodun, E. (1999). Human Resources management, an overview. Concept Publication, Shomolu, Lagos, 110-121.

Abualrob, A.A. & Kang, J., 2016, 'The barriers that hinder the adoption of e-commerce by small businesses: Unique hindrance in Palestine', *Information Development* 32(5), 1528-1544. https://doi.org/10.1177/0266666915609774.

Abubakar, A. M., Elrehail, H., Alatailat, M. A., & Elc¸i, A. (2017). Knowledge management, decision-making style and organizational performance. *Journal of Innovation & Knowledge*, 4(2), 104–114.

AbuTawahina, M. S. (2015). *Capital Structure and Firms Financial Performance: Evidence from Palestine* (dissertation). Islamic University – Gaza Deanship of Post Graduate Studies Faculty of Commerce Accounting Department.

Adam, E.E. (1994). Alternative quality improvement practices and organization performance. *Journal of Operations Management* (pp. 27- 44).

Aga, D. A., Noorderhaven, N., & Vallejo, B. (2016). Transformational leadership and project success: The mediating role of team-building. *International Journal of Project Management*, 34, 806–26. doi:10.1016/j.ijproman.2016.02.012 .

Agrebi, S., & Jallais, J. (2015). Explain the intention to use smartphones for mobile shopping. Journal of Retailing and Consumer Services, 22, 16-2

Agyemang, G., & Broadbent, J. (2015). Management control systems and research management in universities: An empirical and conceptual exploration. *Accounting, Auditing & Accountability Journal*, 28(7), 1018–1046.

Ahrens, T., & Chapman, C. C. (2004). Accounting for flexibility and efficiency: A field study of management control systems in a restaurant chain. *Contemporary Accounting Research*, 21(2), 271–301.

Aiyar, A., & Venugopal, S. (2019). Addressing the Ethical Challenge of Market Inclusion in Base-of-the-Pyramid Markets: A Macromarketing Approach. *Journal of Business Ethics, 164*(2), 243-260. doi:10.1007/s10551-019-04275-9

Ajzen, I., & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behavior.

Akinwale, Y. O., Adepoju, O. O., & Olomu, M. O. (2017). The impact of technological innovation on SME's profitability in Nigeria. *International Journal of Research, Innovation and Commercialisation*, 1(1), 74–92. doi:10.1504/IJRIC.2017. 10003190

Akman, G., & Yilmaz, C. (2008). Innovative capability, innovation strategy and market orientation: an empirical analysis in Turkish software industry. *International Journal of Innovation Management*, 12(01), 69–111.

Alegre, J., & Chiva, R. (2008). Assessing the impact of organizational learning capability on product innovation performance: An empirical test. *Technovation,* 28(6), 315–326.

Allport, G. W. (1935). *Attitudes. In C. A. Murchinson (Ed.), A Handbook of Social Psychology* (Vol. 2, pp. 798-844). Worcester, MA: Clark University Press.

Al-Mamary, Y. H., Shamsuddin, A., & Aziati, N. (2014). Factors affecting successful adoption of management information systems in organizations towards enhancing organizational performance. *American Journal of Systems and Software*, 2(5), 121-126.

Al-Maroof, R. S., & Al-Emran, M. (2018). Student's acceptance of Google classroom: An exploratory study using PLS-SEM approach. *International Journal of Emerging Technologies in Learning*, 13(6), 112-123.

Aminu Ahmad, N., & Mohamed, R. (2018). Management Control System and Firm Performance Resource Based View Perspective. *Management Control System and Firm Performance Resource Based View Perspective, 1*, 1-8. Retrieved from http://repo.uum.edu.my/25692/1/MAYFEB JBM 1 2018 1 8.pdf.

Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33-46.

Anderson, A., & Gupta, P. P. (2010). A cross-country comparison of corporate governance and Firm performance: do financial structure and the legal system matter? „*Journal of Contemporary Accounting & Economics*, 5(2), 61-79.

Andrasik, F., & Heimberg, J. S. (1982). Self- management procedures. In L.W. Frederikson (Ed.), Handbook of organizational behavior management (pp. 219-247). New York: Wiley.

Angeles, R., 2014, 'Using the technology-organization-environment framework for analyzing Nike's "Considered Index" green initiative, a decision support system-driven system', *Journal of Management and Sustainability* 4(1), 96. https://doi.org/10.5539/jms.v4n1p96.

Anthony, Robert N (1965), *Planning and Control Systems: A Framework for Analysis*. Boston: Harvard University.

Ashrafi, R., Sharma, S.K., Al-Bedi, A.H. & AlGharbi, K., 2014, 'Achieving business success through information and communication technologies adoption by small and medium enterprises in Oman', *Middle-East Journal of Scientific Research* 22(1), 138-146.

Atuahene-Gima, K. (2004). Strategic decision comprehension and new product development outcomes in new technology Ventures. *Academy of Management Journal*, 47(4), 583–597.

Awa, H.O., Ojiabo, O.K. & Emecheta, B.C., 2015, 'Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs', *Journal of Science & Technology Policy Management* 6(1), 76-94. https://doi.org/10.1108/JSTPM-04-2014-0012.

Anem .Lengnick-Hall, C.A. & Wolff, J.A., 1999. Similarities and contradictions in the core logic of three strategy research streams. *Strategic Management Journal*, 20(12), pp. 1109–1132.

Anthony, K. R., Marshall, P. A., Abdulla, A., Beeden, R., Bergh, C., Black, R., & Green, A. (2015). Operationalizing resilience for adaptive coral reef management under global environmental change. *Global change biology*, 21(1), 48-61.

Antonelli, C., & Colombelli, A. (2011). The generation and exploitation of technological change: market value and total factor productivity. *The Journal of Technology Transfer*, 36(4), 353-382.

Antony, J.P. and Bhattacharyya, S. (2010) Measuring Organizational Performance and Organizational Excellence of SMEs—Part 2: An Empirical Study on SMEs in India. Measuring Business Excellence, 14, 42-52.

Aragon-Sanchez, A., & Sánchez-Marín, G. (2005). Strategic orientation, management characteristics, and performance: A study of Spanish SMEs. *Journal of Small Business Management*, 43(3), 287.

Argote, L. (2012) Organizational Learning: Creating, Retaining and Transferring Knowledge. Springer Science & Business Media, Berlin.

Argote, L. and Miron-Spektor, E. (2011), “Organizational learning: from experience to knowledge”, *Organization Science*, Vol. 22 No. 5, pp. 1123-1137.

Argyris, C. and Schön, D.A. (1978), Organizational Learning: A Theory of Action Perspective, *Addison- Wesley Publishing Company*, Reading, MA.

Argyris, C. and Schön, D.A. (1996), Organizational Learning II: Theory, Method, and Practice, *Addison- Wesley Publishing Company*, Reading MA.

Argyropoulou, M. (2017). *Information Systems' Effectiveness And Organizational Performance* (dissertation). Brunel Business School Brunel University.

Arinanye, R. T. (2015). *Organizational Factors Affecting Employee Performance At The College Of Computing And Information Science* (dissertation). CIS), Makerere University, Kampala – Uganda.

Arjaliès, D. L., & Mundy, J. (2013). The use of management control systems to manage CSR strategy: A levers of control perspective. *Management Accounting Research*, 24(4), 284–300.

Artiach, T., Lee, D., Nelson, D., & Walker, J. (2010). The determinants of corporate sustainability performance. Accounting & Finance, 50(1), 31-51.

Aryee, S., Walumbwa, F. O., Seidu, E. Y., & Otaye, L. E. (2016). Developing and leveraging human capital resource to promote service quality: Testing a theory of performance. *Journal of management,* 42(2), 480-499.

Atalay, M., Anafarta, N., & Sarvan, F. (2013). The relationship between innovation and firm performance: An empirical evidence from Turkish automotive supplier industry. *Procedia-social and behavioral sciences*, 75(3), 226-235.

Atkinson, A., J. Waterhouse, and R. Wells (1997) A Stakeholder Approach to Strategic Performance Measurement, *Sloan Management Review* (Spring).

Atuahene-Gima, K., & Murray, J. Y. (2007). Exploratory and exploitative learning in new product development: a social capital perspective on new technology ventures in China. *Journal of International Marketing,* 15(02), 1–29.

Baker, J. (2012). The technology–organization–environment framework. In Information systems theory (pp. 231-245). *Springer*, New York, NY.

Baker, J., 2012, *The technology-organization-environment framework. Information systems theory*, pp. 231-245, Springer, New York, NY.

Baker, W.E. & Sinkula, J.M., 1999. The Synergistic Effect of Market Orientation and Learning Orientation on Organizational Performance. *Academy of Marketing Science*, 27(4), pp. 411–427.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science*, 1, 164-180.

Barasa, L., Knoben, J., Vermeulen, P., Kimuyu, P., & Kinyanjui, B. (2017). Institutions, resources, and innovation in East Africa. A firm-level approach. *Research Policy*, 46(1), 280–291.

Barnewold, L., & Lottermoser, B. G. (2020). Identification of digital technologies and digitalisation trends in the mining industry. *International Journal of Mining Science and Technology, 30*(6), 747-757. doi:10.1016/j.ijmst.2020.07.003

Barney JB. 1986. Organizational culture: can it be a source of sustained competitive advantage? *Academy of Management Review* 11(3): 656–665.

Barney, J. (1986). Strategic factor markets: Expectations, luck and business strategy. *Management Science,* 32(10), 1231–1241.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Barney, J. (1995). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99-120.

Barney, J. B. (2005). Expectations, Luck, and Business Strategy. *Management: Critical Perspectives on Business and Management*, 2(10), 219.

Barney, J., 1991. Firm Resources and sustained Competitive Advantage. Journal of Management, 17(1), pp. 99–120.

Barney, J., 2001. Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, 27, pp. 643–650.

Barney, J., 2007. Is the resource-based“ view” a useful perspective for strategic management research? Yes. *Academy of Management Review*, pp. 41–56.

Barrows, E., & Neely, A. (2012). Managing Performance in Turbulent Times: Analytics and Insight– Ed Barrows, Andy Neely. New Jersery: *John Wiley & Son Inc*.

Bartley, M. (2016). Health inequality: an introduction to concepts, theories and methods. *John Wiley & Sons.*

Basco, R. (2013). The family's effect on family firm performance: A model testing the demographic and essence approaches. *Journal of Family Business Strategy*, 4(1), 42-66.

Basit, A., & Hassan, Z. (2017). Impact of Capital Structure on Firms Performance: A Study on Karachi Stock Exchange (KSE) Listed Firms in Pakistan. International Journal of Management, Accounting and Economics, 4(2), 118-135.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive theory of depression*. New York: Guilford Press.

Bedford, D. S. (2015). Management control systems across different modes of innovation: Implications for firm performance. *Management Accounting Research*, 28, 12–30

Bennis, W. & Nanus, B. (1985). *Leaders*. New York: Harper & Row.

Bergek, A., Hekkert, M., Jacobsson, S., Markard, J., Sandén, B., & Truffer, B. (2015). Technological innovation systems in contexts: Conceptualizing contextual structures and interaction dynamics. *Environmental Innovation and Societal Transitions*, 16, 51-64.

Berry, A.J., Coad, A.F., Harris, E.P., Otley, D.T. and Stringer, C. 2009. Emerging themes in management control: A review of recent literature. *The British Accounting Review*, 41(1): 2-20.

Besio, C., & Pronzini, A. (2014). Morality, ethics, and values outside and inside organizations: An example of the discourse on climate change. *Journal of Business Ethics*, 119(3), 287–300

Betcherman, G. 1992. "Are Canadian Firms Underinvesting in Training?" *Canadian Business Economics*. 1(1): 25-33.

Bevan, S. (2012). Good work, High performance and productivity. The paper prepared for the *European HRD Forume,* Lisbon, (2012).

Bienkowska-Golasa, W. (2017). How university students perceive running a business–selected aspects. *Acta Scientiarum Polonorum. Oeconomia*, 16(4), 5-12.

Bin Dost, M., Ahmed, D. Z., Shafi, N., and Shaheen, W. A (2011) Impact of employee commitment on organizational performance. *Arabian Journal of Business and Management Review*, 1 (3).

Bin Zainuddin, Y. (2017). Moderating effect of environmental turbulence on firm's technological innovation capabilities (TIC) and business performance in the automotive industry in Malaysia: A conceptual framework. *In MATEC web of Conferences* (Vol.90, p. 01009). EDP Sciences.

Binz, C., Truffer, B., & Coenen, L. (2014). Why space matters in technological innovation systems—Mapping global knowledge dynamics of membrane bioreactor technology. *Research Policy*, 43(1), 138-155.

Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How do firmsadapt to discontinuous change? Bridging the dynamic capabilities and ambidexterity perspectives. *California Management Review,* 58(4), 36-58.

Bisbe, J., & Otley, D. (2004). The effects of interactive use of management control systems on product innovation. *Accounting, Organizations and Society*, 29, 709–737.

Blau, p., & Scoti. W. R., (1972), *Formal Organizations, San Francisco*, Chandler Publishing.

Blevins, T. L., Wojsznis, W. K., & Nixon, M. J. (2018). U.S. Patent No. 9,983,559. Washington,DC: U.S. Patent and Trademark Office.

Blockchains. (2018, February 1). *Growing use of digital wallets* [Summary of studies by country]. Retrieved November 25, 2021, from http://bcmy.io/blog/growing-use-of-digital-walletssummary-of-studies-by-country.

Boiral, O. (2013). Sustainability reports as simulacra? A counter-account of A and A+ GRI reports. *Accounting, Auditing & Accountability Journal*, 28, 12-16.

Bollen, K. A. (1989). *Structural equations with latent variables*. NY: John Wiley & Sons, Inc.

Boons, F., Montalvo, C., Quist, J., & Wagner, M. (2013). Sustainable innovation, business models and economic performance: an overview. *Journal of Cleaner Production*, 45, 1-8.

Borgman, H.P., Bahli, B., Heier, H. & Schewski, F., (2013), 'Cloudrise: Exploring Cloud Computing Adoption and Governance with the TOE Framework', *2013 46th Hawaii International Conference on System Sciences, Wailea, Maui*. 4425-4435. https://doi.org/10.1109/HICSS.2013.132.

Bower, J. L. (1970). Managing the Resource Allocation Process: A Study of Corporate Planning and Investment. Boston, MA: *Harvard Business School Press*.

Boxenbaum, E., & Jonsson, S. (2017). Isomorphism, diffusion and decoupling: Concept evolution and theoretical challenges. *The Sage handbook of organizational institutionalism*, 2, 79- 104.

Bratianu, C. (2018). Intellectual capital research and practice: 7 myths and one golden rule. *Management and Marketing*, 13(2), 859–879.

Brem, A., & Voigt, K. I. (2010). Integration of market pull and technology push in the corporate front end and innovation management—Insights from the German software industry. *Technovation,* 29(5), 351-367.

Brenner P (2004). *Workers physical surrounding*. Impact Bottom Line Accounting: Smarts Pros.com.

Bresman, H. and Zellmer-Bruhn, M. (2013), "The structural context of team learning: effects of organizational and team structure on internal and external learning", *Organization Science*, Vol. 24 No. 4, pp. 1120-1139.

Breznik, L., & D. Hisrich, R. (2014). Dynamic capabilities vs. innovation capability: Are they related? *Journal of Small Business and Enterprise Development*, 21(3), 368-384.

Breznik, L., & Lahovnik, M. (2016). Dynamic capabilities and competitive advantage: Findings from case studies. *Management: journal of contemporary management* issues, 21(Special issue), 167-185.

Brown TA. (2006). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Press.

Bruining, H., Bonnet, M., & Wright, M. (2004). Management control systems and strategy change in buyouts. *Management Accounting Research*, 15(2), 155–177.

Brynjolfsson, E., Rock, D., & Syverson, C. (2017). *Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics* (No. w24001). National Bureau of Economic Research.

Bryson, J. (1995). *Strategic planning for public and non-profit organization San Francisco*: Jossey-Bass Publishers.

Bunderson, J.S. and Boumgarden, P. (2010), "Structure and learning in self-managed teams: why 'bureaucratic' teams can be better learners", Organization Science, Vol. 21 No. 3, pp. 609-624.

Burns T., Stalker G. M. (1994). *The Management of Innovation*. Oxford: Oxford University Press.

Burns, D. D. (1980). *Feeling good: The new mood therapy*. New York: William Morrow.

Burns, T. & Stalker, G.M., 1961. *The Management of Innovation* 1st ed., London, UK: Lavistock.

Burrell, G. and Morgan, G. 1979. *Sociological Paradigms and Organizational Analysis*, Heinemann, London.

Busch, T., & Hoffmann, V. H. (2011). How hot is your bottom line? Linking carbon and financial performance. *Business & Society*, 50(2), 233-265.

Bushiri, C. (2014). *The Impact of Working Environment on Employees' Performance: The Case of Institute of Finance Management In Dar Es Salaam Region* (dissertation). Human Resources Management Of The Open University Of Tanzania.

Buttle, F., & Maklan, S. (2019). *Customer relationship management: concepts and technologies*. Routledge.

Byrne, B. M., & Van de Vijver, F. J. (2010). Testing for measurement and structural equivalence in large-scale cross-cultural studies: Addressing the issue of nonequivalence. International *Journal of Testing*, 10(2), 107-132.

Calantone, R. J., Cavusgil, S. T., & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31(6), 515–524.

Camisón, C., & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of business research*, 67(1), 2891-2902.

Camisón, C., &Villar-López, A. (2014). Organizational innovation an enabler of technological innovation capabilities and firm performance. *Journal of business research*, 67(1), 2891-2902.

Capehart, Barney, Wayne C.Turner, and William J.Kennedy. 2012. *Guide to Energy Management*. The Fairmont Press, Inc.

Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. W. Bohrnstedt, & E. F. Borgatta (Eds.), *Social measurement: Current issues* (p.65-115). Beverly Hills: Sage.

Carroll, A., & Buchholtz, A. K. (2011), *Business & Society* (8 th edition), South-Western Cengage Learning, OH: Mason

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control theory approach to human behavior*. New York: Springer-Verlag.

Catelli, A. (2001), Controladoria: uma abordagem dagestaoecono ̂mica GECON, Atlas, Sa ̃o Paulo.

Cautela, J. R. (1969). *Behavior therapy and self- control: Techniques and applications*. In C.M. Franks (Ed.), Behavioral therapy: Appraisal and status (pp. 323-340). New York: McGraw- Hill.

Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, 46(1), 3-16.

Certo, S. and Peter, J.P. (1993), Administrac ̧a ̃o estrate ́gica, Makron, Sa ̃o Paulo.Chakravarthy, B. S., & Doz, Y. (1992). Strategy process research: Focusing on corporate self-renewal. *Strategic Management Journal*, 13(S1), 5-14.

Chandler, G.N. & Hanks, S.H., 1994. Market attractiveness, resource-based capabilities, venture strategies, and venture performance. *Journal of Business Venturing*, 9(4), pp. 331–349.

Chang, C.-H. (2011). The influence of corporate environmental ethics on competitive advantage: The mediation role of green innovation. *Journal of Business Ethics*, 104(3), 361–370.

Chartpolrak, P (2021). *A Development Of Enterprise Risk Management Model That Affects Firm Financial Performance For Energy Efficiency Services In Thailand* King Mongkut's Institute of Technology Ladkrabang Business School (dissertation).

Chaveesuk, S., (2010). *The Determinants of the Adoption and Application of Business Intelligence: An ERP Perspective*. PhD. School of Management and Information Systems Faculty of Business and Law Victoria University (dissertation).

Chege, S. M., Wang, D., & Suntu, S. L. (2019). Impact of information technology innovation on firm performance in Kenya. *Information Technology for Development*, 1-30.

Chen, L., Tang, O., & Feldmann, A. (2015). Applying GRI reports for the investigation of environmental management practices and company performance in Sweden, China and India. *Journal of Cleaner Production*, 98, 36-46.

Chen, M. J., & Miller, D. (2015). Reconceptualizing competitive dynamics: A multidimensional framework. *Strategic Management Journal*, 36(5), 758-775.

Chen, S. Y., Wu, W. C., Chang, C. S., Lin, C. T., Kung, J. Y., Weng, H. C.& Lee, S. I. (2015). Organizational justice, trust, and identification and their effects on organizational commitment in hospital nursing staff. *BMC health services research*, 15(1), 363.

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting, organizations and society*, 28(2), 127-168.

Chenhall, R., 2005. Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. *Accounting, Organizations and Society*, 30(5), pp. 395–422.

Cherns A. (1976). *The principles of sociotechnical design*. Hum. Relations 29, 783–792. 10.1177/001872677602900806

Chiniara, M., & Bentein, K. (2018). The servant leadership advantage: When perceiving low differentiation in leader-member relationship quality influences team cohesion, team task performance and service OCB. *The Leadership Quarterly*, 29(2), 333 345.doi:10.1016/j.leaqua.2017.05.002.

Chipika, S., & Wilson, G. (2006). Enabling technological learning among light engineering SMEs in Zimbabwe through networking. *Technovation*, 26(8), 969–979.

Chiu, C.-Y., Chen, S. & Chen, C., (2017), 'An integrated perspective of TOE framework and innovation diffusion in broadband mobile applications adoption by enterprises', *International Journal of Management, Economics and Social Sciences* (*IJMESS*) 6(1), 14-39.

Chua, W. 1986. Radical developments in accounting thought. *The Accounting Review*, 41(4): 601-632.

Churchill, N. C., & Lewis, V. L. (1983). *The five stages of small business growth*. Harvard Business Review, 1(1), 30–50.

Clarke, P., & O'Connor, R. V. (2012). The situational factors that affect the software development process: Towards a comprehensive reference framework. *Information and Software Technology*, 54(5), 433-447.

Coad, A., Segarra, A., & Teruel, M. (2016). "Innovation and firm growth: Does firm age play a role? Research Policy, 45(No. 2), 387–400.

Coccia, M. (2017). Sources of technological innovation: Radical and incremental innovation problem-driven to support competitive advantage of firms. *Technology Analysis & Strategic Management,* 29(9), 1048-1061.

Coccia, Mario (2017), Theorem of Not Independence of Any Technological Innovation - Philosophical and Theoretical Foundations of the Evolution of Technology No. 22 -Arizona State University (USA).

Coffman, D. J., Vanderveen, T. W., Lee, B. A., & Schlotterbeck, D. L. (2017). U.S. Patent No. 9,600,633. Washington, DC: U.S. Patent and Trademark Office.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 128-152

Collis, D. J. (1994). Research note: How valuable are organizational capabilities? *Strategic Management Journal,* 15(S1), 143-152.

Colorosa, S. R. (2016). *Case Study Of Performance Management Techniques: Voices of Managers and Employees* (dissertation). Colorado State University Fort Collins, Colorado.

Combs, J.G., Crook, T.R. and Shook, C.L. 2005. "The Dimensionality of Organizational Performance and its Implications for Strategic Management Research." In D.J. Ketchen and D.D. Bergh (Eds.). *Research Methodology in Strategy and Management*. 2 : 259-286.

Conger, J. A. (1999). Charismatic and transformational leadership in organizations: An insider's perspective on these developing streams of research. *Leadership Quarterly*, 10, 145-170.

Cooper, C. L. (2018). Stress and Technological Innovation: A Comparative Study of Design Practices and Implementation Strategies. *Managerial, Occupational and Organizational Stress Research*, 375.

Cooper, D.; Patel, P. C.; Thatcher, S. M. B. It depends: Environmental context and the effects of faultlines on top management team performance. *Organization Science*, v. 25,n. 2, p. 633–652, 2014.

Cooper, R. (2015). *Formal organization as representation: remote control, displacement and abbreviation*. In For Robert Cooper (pp. 188-206). Routledge.

Cooper, R. G. (1994). Third‐generation new product processes. *Journal of Product Innovation Management*, 11(1), 3-14.

Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J., 1999. New product portfolio management: practices and performance. *Journal of Product Innovation Management* 16 (4), 333–351.

Cote, R.(2017). A comparison of leadership theories in an organizational environment. *International Journal of Business Administration*, 8(5), 28-35.

Covin, J.G. & Slevin, D.P., 1991. A Conceptual Model of Entrepreneurship as Firm Behavior. *Entrepreneurship Theory and Practice*, 16(1), pp. 7–25.

Cresswell, K., & Sheikh, A. (2013). Organizational issues in the implementation and adoption of health information technology innovations: an interpretative review. *International journal of medical informatics*, 82(5), e73-e86.

Csugány, J. (2016). *The Duality Of Technological Progress: The Institutional Features Of Innovation- And Imitation-Based Economies* (dissertation). University Of Debrecen Doctoral School Of Economics.

Curado, C. (2006), "Organisational learning and organisational design", *The Learning Organization*, Vol. 13 No. 1, pp. 25-48.

Dahlander, L., O'Mahony, S. and Gann, D.M. (2016), "One foot in, one foot out: how does individuals' external search breadth affect innovation outcomes?" *Strategic Management Journal*, Vol. 37 No. 2, pp. 280-302.

Dalton. G. W., (1971). *'Motivation and control in organizations'. in Motivation and control in organizations,* G. W. Dalton and P. R. Lawrence (cds.), Homewood, IL, Richard D. Irwin, Inc., p. 1-35.

Damanpour, F., & Aravind, D. (2012). Managerial innovation: Conceptions, processes and antecedents. *Management and organization review*, 8(2), 423-454.

Darabont, D. C., Antonov, A. E., & Bejinariu, C. (2017). Key elements on implementing an occupational health and safety management system using ISO 45001 standard. *In MATEC Web of Conferences* (Vol. 121, p. 11007). EDP Sciences.

David, F. R. (1995). *Concepts of strategic management* New Jersey: Prentice Hall.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 982-1003.

Day, G.S., 1994. The capabilities of market-driven organizations. *Journal of Marketing*, 58(4), pp. 37–52.

De Massis, A., Frattini, F., & Lichtenthaler, U. (2013). Research on technological innovation in family firms: Present debates and future directions. *Family Business Review*, 26(1),1031.

De Moura Maciel, A. C., Pardini, D. J., & Monteiro, P. R. R. (2018). Social risk management: structuring, validation, and testing of a survey in the mining industry. *Social Responsibility Journal*. 20(4)

De Zubielqui, G. C., Jones, J., & Lester, L. (2016). Knowledge inflows from market and science-based actors, absorptive capacity. Innovation and performance – A study of SMEs. *International Journal of Innovation Management,* 20(6), 1–31.

Deci, E. & Ryan, R. (1985). The support of autonomy and control of behavior. *Journal of Personality and Social Psychology*, 53, 1024- 1037.

Delon, WV, Ruyter, KD & Lemmink, J 2004, 'An empirical assessment of the influence of customer emotions and contact employee performance on encounter and relationship satisfaction', Journal of Business Research, vol. 57, no. 4, pp. 437-44.

Den Hertog, P., van der Aa, W., & de Jong, M. W. (2010). Capabilities for managing service innovation: Towards a conceptual framework. *Journal of Service Management*, 21(4), 490-514.

Denrell, J., Fang, C., & Winter, S. G. (2003). The economics of strategic opportunity. *Strategic Management Journal*, 24(10), 977-990.

Di Stefano, G., Peteraf, M. and Verona, G. (2014). The or-ganizational drivetrain: a road to integration of dynamic capabilities research. *Academy of Management Perspectives*,28, pp. 307–327.

Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35(12), 1504-1511.

Donaldson, L. (2001), *The Contingency Theory of Organizations, Sage Publications*, Thousand Oaks.

Dubois, A., & Gadde, L. E. (2002). Systematic combining: An abductive approach to case research. Journal of Business Research, 55(7), 553-560.

Dubois, A., & Gadde, L. E. (2014). "Systematic combining"—A decade later. *Journal of Business Research*, 67(6), 1277-1284.

Easterby-Smith, M., Lyles, M. A., & Peteraf, M. A. (2009). Dynamic capabilities: Current debates and future directions. *British Journal of Management*, 20(S1), S1-S8.

Egbe, I. N. Y. A. E. (2015). *The Design And Use Of Management Control Systems In A Multinational Enterprise – Evidence from an Emerging Multinational* (dissertation). Department of Accounting and Finance Business School College of Social Sciences University of Birmingham.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10-11), 1105-1121.

Eldridge, J.E.T. and Crombie, A. D. (1974), *A Sociology of Organizations*. London: George Allen and Unwin.

Ellis, A. (1977). *The basic clinical theory of rational- emotive therapy*. New York: Springer.

Fidishun, D. (2000). Andragogy and technology: Integrating adult learning theory as we teach with technology. Conference Paper, 5th *Annual Instructional Technology Conference*. Tennessee State University.

Ellinger, A. D., Ellinger, A. E., Yang, B., & Howton, S. W. (2002). The relationship between the learning organization concept and firms' financial performance: an empirical assessment. *Human Resource Development Quarterly*, 13(1), 5–22.

El-Sayed Ebaid, I. (2010). The impact of capital-structure choice on Firm performance: empirical evidence from Egypt. *The Journal of Risk Finance*, 10(5), 477-487.

Engetou, E. (2017). *The Impact Of Training And Development On Organizational Performance* (dissertation). Centria University of Applied Sciences Business Management.

Epstein, M. J., Buhovac, A. R., & Yuthas, K. (2015). Managing social, environmental and financial performance simultaneously. *Long range planning*, 48(1), 35-45.

Erik Brynjolfsson, Lorin M. Hitt (1996), “Paradox Lost; Firm-Level evidence on the Return of Information System Spending”, *Management Science*, Volume 42, Issue 4 (April).

Etienne, J. (2011). Compliance Theory: A Goal Framing Approach. *Law & Policy, 33*(3), 305-333. doi:10.1111/j.1467-9930.2011.00340.x

Evans-Lacko, S., Henderson, C., & Thornicroft, G. (2013). Public knowledge, attitudes and behavior regarding people with mental illness in England 2009-2012. *The British Journal of Psychiatry*, 202(s55), s51-s57.

Fan, Q., & Xie, X. (2020). Internal Control, Technological Innovation and Corporate Performance: An Empirical Analysis from Listed Companies of China's Manufacturing Industry. *Advances in Management*, 13(1), 1-14.

Findik, D., 2013, *ICT adoption, software investment and firm efficiency in Turkey*, the Graduate School of Social Sciences of Middle East Technical University, Ankara.

Fleischman, R.K., Kalbers, L.P., and Parker, L.D. (1996), “Expanding the dialogue: industrial revolution costing historiography”, *Critical Perspectives on Accounting*, Vol. 7, No. 3, pp. 315-337.

Forsman, H. (2011). Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors. *Research Policy*, 40(5), 739-750.

Foss, N.J., Husted, K. and Michailova, S. (2010), “Governing knowledge sharing in organizations: levels of analysis, governance mechanisms, and research directions”, *Journal of Management Studies,* Vol. 47 No. 3, pp. 455-482.

Foxon, T. J. (2014). *Technological lock-in and the role of innovation*. In Handbook of sustainable development. Edward Elgar Publishing.

Franke, T. M., Ho, T., & Christie, C. A. (2012). The chi-square test: Often used and more often misinterpreted. *American Journal of Evaluation,* 33(3), 448-458.

Frederick Onyango Ogola, George N. Njenga, Peter C. Mhando & Moses N. Kiggundu (2015) A Profile of the East African Community, *Africa Journal of Management*, 1:4, 333-364, DOI: 10.1080/23322373.2015.1106719 .

Frey, B. (2018). *The SAGE encyclopedia of educational research, measurement, and evaluation* (Vols. 1-4). Thousand Oaks,, CA: SAGE Publications, Inc. doi: 10.4135/9781506326139.

Freeman, R. E. (1984). *Strategic Management: A Stakeholders Approach*. Boston: Pitman.

Freeman, R. E., Harrison, J. S., & Zyglidopoulos, S. (2018*). Stakeholder theory: Concepts and strategies.* Cambridge University Press.

Gabarro, J. J. (2014). *The development of working relationships*. In Intellectual teamwork (pp. 93-124). Psychology Press.

Gaboardi, Marco, Hyun-Woo Lim, Ryan M. Rogers, and Salil P. Vadhan. 2016. "Differentially Private Chi-Squared Hypothesis Testing: Goodness of Fit and Independence Testing." In ICML'16 Proceedings of the 33rd International Conference on International Conference on Machine Learning, New York, NY, June 19-24, 2016, Volume 48: 2111-2120.

Gagné P, Hancock GR.(2006).Measurement model quality, sample size, and solution propriety in confirmatory factor models. *Multivariate Behavioral Research*; 41:65–83.

Galbraith, J.R., 1973. *Designing Complex Organizations*, Boston, MA.: Addison-Wesley Longman Publishing Co.Inc.

Galunic, D.C. and Eisenhardt, K.M. (2001). Architectural in-novation and modular corporate forms. *Academy of Management Journal*, 44, pp. 1229–1249.

Gatignon, H., & Xuereb, J. (1997). Strategic orientation of the firm and new product performance. *Journal of Marketing Research*, 77-90.

Gërguri-Rashiti, S., Ramadani, V., Abazi-Alili, H., Dana, L. P., & Ratten, V. (2017). ICT, innovation and firm performance: The transition economies context. *Thunderbird International Business Review*, 59(1), 93–102. doi:10.1002/tie.21772.

Ghobakhloo, M. & Hong Tang, S., 2013, 'The role of owner/manager in adoption of electronic commerce in small businesses: The case of developing countries', *Journal of Small Business and Enterprise Development* 20(4), 754-787. https://doi.org/10.1108/JSBED-12-2011-0037.

Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal*, 12(6), 433-448.

Glinskiy, V. V., Serga, L. K., & Khvan, M. S. (2015). Environmental Safety of the Region: New Approach to Assessment. *Procedia CIRP, 26*, 30-34. doi:10.1016/j.procir.2014.08.017

Goh, S. C. (2003). Improving organizational learning capability: lessons from two case studies. The Learning Organization, 10(4), 216–227.

Gokilavani, R., Kumar, D. V., Durgarani, M., & Mahalakhsmi , R. (2018). Can India Move Towards Digital Sovereign Currency? A Study on Perception of Consumers Towards. *International Journal of Pure and Applied Mathematics*, 119 (17), 2167–2175.

Gond, J.-P., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: theorizing the integration of strategy and sustainability. *Management Accounting Research*, 23(3), 205–223

Goodale, J. C., Kuratko, D. F., Hornsby, J. S., & Covin, J. G. (2011). Operations management and corporate entrepreneurship: The moderating effect of operations control on the antecedents of corporate entrepreneurial activity in relation to innovation performance. *Journal of operations management*, 29(1-2), 116-127.

Govindarajan, V., 1988. A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy. *Academy of Management Journal*, 31(4), pp. 828–853.

Grant RM. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal,* Summer Special Issue 17: 109–122.

Gray, P.H. and Meister, D.B. (2004), "Knowledge sourcing effectiveness", *Management Science*, Vol. 50No. 6, pp. 821-834

Grayson, K., 1996. *Examining the embedded markets of network* .marketing organizations. In: Iacobucci, D.Ed., Networks in Marketing. Sage, Thousand Oaks, CA, pp. 325–341.

Greenley, G. E., & Foxall, G. R. (1997). Multiple stakeholder orientation in UK companies and the implications for company performance. *Journal of Management Studies, 34*(2), 259-284.

Guan, J., & Ma, N. (2003). Innovative capability and export performance of Chinese firms. *Technovation*, 23(9), 737-747.

Guiffrida, A. L., Datta, P., Dey, A., LaGuardia, P., & Srinivasan, M. (2011). Construct sustainability in logistics operations: a research agenda. *Management Research Review*,32(5), 126-131.

Guo, C., & Miller, J. K. (2010). Guanxi dynamics and entrepreneurial firm creation and development in China. *Management and Organization Review*, 6(2), 267–291.

Gupta, Priya, Guha, Samapti, Krishnaswami, Shiva (2013): Firm growth and its determinants, *Journal of Innovation and Entrepreneurship*, ISSN 2192-5372, Springer, Heidelberg,Vol.2,pp.1-14, http://dx.doi.org/10.1186/2192-5372-2-15.

Haanaes, K. (2016). *Why all businesses should embrace Sustainability some top companies are leading the way.* International Institute for Management Development, IMD, November.

Hadjimanolis, A. (1997). *The Management Of Technological Innovation In Small And Medium Size Firms In Cyprus* (dissertation). Department of Management Studies, Brunel University.

Hair Jr., J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis: A Global Perspective*. 7th Edition, Pearson Education, Upper Saddle River

Hajli, M. N. (2014). The role of social support on relationship quality and social commerce. *Technological Forecasting and Social Change*, 87, 17-27.

Hakala, H., & Kohtamäki, M. (2011). Configurations of entrepreneurial-customer-and technology orientation: Differences in learning and performance of software companies. *International Journal of Entrepreneurial Behavior & Research*, 17(1), 64-81.

Hall, L. M., Charvet, S. R., & Rose-Charvet, S. (Eds.). (2011*). Innovations in NLP: for challenging times.* Crown House Publishing.

Hall, M., 2008. The effect of comprehensive performance measurement systems on role clarity, psychological empowerment and managerial performance. *Accounting, Organizations and Society*, 33(2-3), pp. 141–163.

Hamel, G., & Prahalad, C. K. (1994). *Competing for the future*. Harvard business school press. Boston, MA.

Hammad, S. A.; Jusoh, R.; Oon, E. Y. N. Management accounting system for hospitals: A research framework. *Industrial Management and Data Systems*, v. 110, n. 5, p. 762–784, 2010.

Hashim, N. A. B., Raza, S., & Minai, M. S. (2018). Relationship between entrepreneurial competencies and small Firm performance: are dynamic capabilities the missing link? *Academy of Strategic Management Journal*, 23(5), 98-102.

Haslam, S. A., Ryan, M. K., Kulich, C., Trojanowski, G., & Atkins, C. (2010). Investing with prejudice: The relationship between women's presence on company boards and objective and subjective measures of company performance. *British Journal of Management*, 21(2), 484-497.

Hatch, M. J. (2018). *Organization theory: Modern, symbolic, and postmodern perspectives*. Oxford university press.

Hayes, D.C., 1977. The contingency theory of managerial accounting. *Accounting Review*, pp.22–39.

Hayward MLA. 2000. *Acquirer learning from acquisition experience: evidence from* 1985–1995. Working paper, London Business School, London.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, 24(10), 997-1010.

Helfat, C. E., & Raubitschek, R. S. (2000). Product sequencing: co-evolution of knowledge, capabilities and products. *Strategic Management Journal*, 21(10–11), 961–979.

Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capabilities: Strategy for the (n)ever-changing world. *Strategic Management Journal*, 32(11), 1243-1250.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2007). *Dynamic Capabilities: Understanding Strategic Change in Organizations*. Malden, MA: Blackwell.

Henderson R, Cockburn I. 1994. Measuring competence? Exploring firm effects in pharmaceutical research. Strategic *Management Journal*, Winter Special Issue 15: 63–84.

Henri, J. (2006). Management control systems and strategy: A resource-based perspective. *Accounting, Organizations and Society*, 31, 529–558.

Henri, J.-F., 2006a. Management control systems and strategy: A resource-based perspective. *Accounting, Organizations and Society*, 31(6), pp. 529–558.

Henri, J.-F., 2010. The periodic review of performance indicators: An empirical investigation of the dynamism of performance measurement systems. *European Accounting Review*, 19(1), pp. 73–96.

Hermano, V., & Martín-Cruz, N. (2016). The role of top management involvement in firms performing projects: A dynamic capabilities approach. *Journal of Business Research*, 69(9), 3447-3458.

Hitt LM and E Brynjolfsson (1996). "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value." *MIS Quarterly* 20(2): 121-142.

Hitt, M.A., Ireland, R.D. and Hoskisson, R.E. (2008), Administração Estratégica: competitividade e globalização, Pioneira Thomson Learnig, São Paulo.

Hitt, Michael. (1988). The Measuring of Organizational Effectiveness: Multiple Domains and Constituencies. *Management International Review*. 28. 28-40.

Hmieleski, K. M.; Carr, J. C.; Baron, R. A. Integrating Discovery and Creation Perspectives of Entrepreneurial Action: The Relative Roles of Founding CEO Human Capital, Social Capital, and Psychological Capital in Contexts of Risk Versus Uncertainty. *Strategic Entrepreneurship Journal*, v. 9, n. 4, p. 289–312, 2015.

Hopper, T. and Powell, A. (1985), "Making sense of research into the organizational and social aspects of management accounting: a review of its underlying assumptions", *Journal of Management Studies*, Vol. 22, pp. 429-465.

Hopwood, A., (1974), *Accounting and Human Behavior*, London: Haymarket Publishing Ltd.

Hoque, Z. and James, W. 2000. "Linking Balanced Scorecard Measures to Size and Market Factors: Impact on Organizational Performance." *Journal of Management Accounting Research*. 12 : 1-17.

Hoque, Z., 2004. A contingency model of the association between strategy, environmental uncertainty and performance measurement: impact on organizational performance. *International Business Review,* 13(4), pp. 485–502.

Hoskisson, R.E. et al., 1999. Theory and research in strategic management: Swings of a pendulum. *Journal of Management*, 25(3), pp. 417–456.

Houpis, C. H., Rasmussen, S. J., & Garcia-Sanz, M. (2018). *Quantitative feedback theory: fundamentals and applications*. CRC press.

Hove-Sibanda, P., Sibanda, K., & Pooe, D. (2017). The impact of corporate governance on firm competitiveness and performance of small and medium enterprises in South Africa: A case of small and medium enterprises in Vanderbijlpark. *Acta Commercii*, 17(1), 1-11.

Howell D.C. (2011) Chi-Square Test: Analysis of Contingency Tables. In: Lovric M. (eds) International Encyclopedia of Statistical Science. Springer, Berlin, Heidelberg.

Huber, G.P. (1991), "Organizational learning: the contributing processes and the literatures", *Organization Science*, Vol. 2 No. 1, pp. 88-115.

Hueske, A. K., Endrikat, J., & Guenther, E. (2015). External environment, the innovating organization, and its individuals: A multilevel model for identifying innovation barriers accounting for social uncertainties. *Journal of Engineering and Technology Management*, 35, 45-70.

Hung, K. P., & Chiang, Y. H. (2010). Open innovation proclivity, entrepreneurial orientation, and perceived firm performance. *International Journal of Technology Management*, 52(3/4), 257–274.

Hung, S-Y., Tsai, J.C-A. & Chou, S-T., 2016, 'Decomposing perceived playfulness: A contextual examination of two social networking sites', *Information & Management* 53(6), 698-716.

Hurley, R. F., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: An integration and empirical examination. *The Journal of Marketing*, 42-54.

Hwang, W.; Min, H. Assessing the impact of ERP on supplier performance. *Industrial Management & Data Systems*, v. 113, n. 7, p. 1025–1047, 2013.

Ireland, R.D. and J.W. Webb (2007), "Strategic Entrepreneurship: Creating Competitive Advantages through Stream of Innovation", *Business Horizon*, 50: 49-59.

Islam, T. and Tariq, J. (2018), "Learning organizational environment and extra-role behaviors: The mediating role of employee engagement", *Journal of Management Development*, Vol. 37 No. 3, pp. 258-270. https://doi.org/10.1108/JMD-01-2017-0039

Indarsin, T., & Ali, H. (2017). Attitude toward Using m-Commerce: The Analysis of Perceived Usefulness Perceived Ease of Use, and Perceived Trust: Case Study in Ikens Wholesale Trade, Jakarta–Indonesia. *Saudi Journal of Business and Management Studies*, 2(11), 995-1007.

Ismail, N.A. & King, M., 2014, 'Factors influencing the alignment of accounting information systems in small- and medium-sized Malaysian manufacturing firms', *Journal of Information Systems and Small Business* 1(1-2), 1-20.

Ittner, C.D. & Larcker, D.F., (2003). Coming Up Short on Nonfinancial Performance Measurement, *Harvard Business Review*, November, pp. 1–9.

Jackson DL. (2001). Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: A Monte Carlo investigation. *Structural Equation Modeling*; 8:205–223.

Jaiswal, D., Kaushal, V., Singh, P.K. and Biswas, A. (2021), "Green market segmentation and consumer profiling: a cluster approach to an emerging consumer market", *Benchmarking: An International Journal*, Vol. 28 No. 3, pp. 792-812. https://doi.org/10.1108/BIJ-05-2020-0247

Javeed, S., & Lefen, L. (2019). An Analysis of Corporate Social Responsibility and Firm performance with Moderating Effects of CEO Power and Ownership Structure: A Case Study of the Manufacturing Sector of Pakistan. *Sustainability*, 11(1), 248.

Jaworsk, B. J., (1988), 'toward a theory of marketing control: environmental control, control types, and consequences', *Journal of Marketing*, v .25, July, p. 23-39.

Jayaraman, P., Yeoh, J. W., Zhang, J., & Poh, C. L. (2018). Programming the Dynamic Control of Bacterial Gene Expression with a Chimeric Ligand-and Light-Based Promoter System. *ACS synthetic biology*, 7(11), 2627-2639.

Jelfs, Peter (2019) *financial performance studies of University Spin-Off companies (USOs) in the West Midlands*. [Thesis] (Unpublished)

Jelinek, M. (1977). Technology, Organizations and Contingency, *Academy of Management Review*, 17-26.

Jerez-Gomez, P., Céspedes-Lorente, J., & Valle-Cabrera, R. (2005). Organizational learning capability: a proposal of measurement. *Journal of Business Research*, 58(6), 715–725

Jia, Q., Guo, Y., & Barnes, S. J. (2017). Enterprise 2.0 post-adoption: Extending the information system continuance model based on the technology-Organization-environment framework. *Computers in Human Behavior, 67*, 95-105. doi:10.1016/j.chb.2016.10.022

Johnson P (1993) *Management Control and Organizational Behavior* / P. Johnson, J. Gill. – Athenaeum Press Ltd., Newcastle-upon-Tyne.

Johnson, J. V., Gardell, B., & Johannson, G. (2020). *The psychosocial work environment: work organization, democratization, and health: essays in memory of Bertil Gardell*. Routledge.

Johnson, W. H. (2011). Managing university technology development using organizational control theory. *Research Policy*, 40(6), 842-852.

Jørgensen, B., & Messner, M. (2010). Management control in new product development: The dynamics of managing flexibility and efficiency. *Journal of Management Accounting Research*, 21(1), 99-124.

Journeault, M. (2016). The influence of the eco-control package on environmental and economic performance: A natural resource- based approach. Journal of Management *Accounting Research*,28(2), 149–178.

Kaldybekova, S. (2018). *Evaluation of the company's financial performance through financial analysis methods* (dissertation). Masaryk University Faculty of Economics and Administration.

Kanfer, F. H. (1970). Self-regulation: Research, issues, and speculations. In C. Neuringer & J. L. Michael (Eds.), *Behavioral Modification in Clinical Psychology* (pp. 178-220). New York: Appleton-Century-Crofts.

Kang, T., Baek, C. andLee, J-d. (2017). The persistency and volatility of the firm R&D investment: Revisited from the perspective of technological capability. *Research Policy*, 46, 1570–1579.

Kaplan, R. S. and D.P. Norton (1992) The Balanced Scorecard: Measures that Drive Performance, *Harvard Business Review*, (January-February): 71-79.

Kaplan, R. S., & Norton, D. P. (1996). The balanced scorecard: Translating strategy into action, *Harvard Business Press*. 2-5

Karami, A. (2012). *Strategy formulation in entrepreneurial firms*. Ashgate Publishing, Ltd

Kennedy, S., Whiteman, G., & van den Ende, J. (2017). *Radical innovation for sustainability: The power of strategy and open innovation*. Long Range Planning, 50(6), 712-725.

Kenneth R. Andrews (1971), *'The Concept of Corporate Strategy', in The Concept of Corporate Strategy*, Homewood, IL: Dow Jones-Irwin, pp. 18-46.

Kessler, E.H., Bierly, P.E. and Gopalakrishnan, S. (2000), "Internal vs external learning in new product development: effects on speed, costs and competitive advantage", *R&D Management*, Vol. 30 No. 3, pp. 213-224.

Khine, M. S. (Ed.). (2013). *Application of structural equation modeling in educational research and practice* (Vol. 7). SensePublishers.

Kilangi, A.M. (2012). *The Determinants of ICT Adoption and Usage among SMEs The Case of the Tourism Sector in Tanzania* De Boelelaan Vrije Universiteit.

Kim, D.H. (2005), "The link between individual and organizational learning", in Starkey, K., Tempest, S.and McKinlay, A. (Eds), *How Organizations Learn, Thomson, Australia*, pp. 29-50.

Kim, E. S., Arcak, M., & Zamani, M. (2018, April). Constructing control system abstractions from modular components. *In Proceedings of the 21st International Conference on Hybrid Systems: Computation and Control* (part of CPS Week) (pp. 137-146).

Kim, Y. J., Chun, J. U., & Song, J. (2009). Investigating the role of attitude in technology acceptance from an attitude strength perspective. *International Journal of Information Management*, 29(1), 67-77.

Kimbugwe, K., Perkidis, N., Yeung, M., Kerr, W., & Perdikis, N. (2012). *Economic Development Through Regional Trade: A Role for the New East African Community*?. Springer.

Kindström, Daniel, Mikael Ottosson, and Patrik Thollander. 2017. "Driving Forces for and Barriers to Providing Energy Services—a Study of Local and Regional Energy Companies in Sweden." *Energy Efficiency* 10(1): 21–39. http://dx.doi.org/10.1007/s12053-016-9437

Kleis, J. (2016). African Regional Community Courts and their Contribution to Continental Integration. *Progress in Development Studies, 20*(3), 2020th ser. doi:10.5771/9783845275000

Knights, D., & Willmott, H. (Eds.). (2016). Labour process theory. Springer.

Knoop, R.T. 1991. "Achievement of Work Values and Participative Decision Making." *Psychological Reports*. 58: 775-781.

Kodongo, O., Mokoaleli-Mokoteli, T., & Maina, L. (2015). Capital structure, profitability and firm value: panel evidence of listed firms in Kenya. *African Finance Journal*, 17(1), 1–20.

Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science* 3: 383–397

Kohun S (1992). Business Environment. Ibadan: University Press Kyko OC (2005). Instrumentation: *Know yourself and Others Longman Dictionary of Contemporary English* (2003) 3rd editions: Harloa Pearson Educational Limited.

Kossaï, M. & Piget, P., 2014, 'Adoption of information and communication technology and firm profitability: Empirical evidence from Tunisian SMEs', *The Journal of High Technology Management Research* 25(1), 9-20. https://doi.org/10.1016/j.hitech.2013.12.003.

Kossaï, M., & Piget, P. (2014). Adoption of information and communication technology and firm profitability: Empirical evidence from Tunisian SMEs. *The Journal of High Technology Management Research*, 25(1), 9–20. doi:10.1016/j. hitech.2013.12.003.

Kramer, M. R., & Porter, M. (2011). *Creating shared value*. FSG.

Kuncoro, W., & Suriani, W. O. (2018). Achieving sustainable competitive advantage through product innovation and market driving. *Asia Pacific Management Review*, 23(3), 186-192.

Kuratko, D. F. (2017). Corporate entrepreneurship 2.0: Research development and future directions. *Foundations and Trends in Entrepreneurship*, 13(6), 441–490. doi:10.1002/9781118785317.weom130030.

Kyla, H. K. J., Puumalainen, K., & Saarenketo, S. (2005). Entrepreneurial orientation, dynamic capabilities and international performance. *Journal of International Entrepreneurship*, 3(3), 223–243.

Kyratsis Y, Ahmad R, Holmes A, (2010): Understanding the Process of Innovation Adoption in 12 NHS trusts - technology selection, procurement and implementation to help reduce HCAIs., Department of Health, England,331[https://www.wp.dh.gov.uk/hcai/files/2011/07/Technology-Adoption-Study_DH-Approved_FINAL-FULL-REPORT_Feb-2011_including-Acknlowledgments.pdf].

Laihad, R. C. (2013). Pengaruh Perilaku Wajib Pajak terhadap Penggunaan E-Filing Wajib Pajak di Kota Manado. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi*, 1(3).

Lamarche, P. and Maillet, L. (2016), "The performance of primary health care organizations depends on interdependences with the local environment", *Journal of Health Organization and Management*, Vol. 30 No. 6, pp. 836-854. https://doi.org/10.1108/JHOM-09-2015-0150.

LAU, A. K. W. Influence of contingent factors on the perceived level of supplier integration: A contingency perspective. *Journal of Engineering and Technology Management* - JET-M, v. 33, p. 210–242, 2014.

Laughlin, R. (1995), "Empirical research in accounting: alternative approaches and a case for 'middle range' thinking", *Accounting, Auditing and Accountability Journ*al Vol. 8, No. 1, pp. 63-87.

Lawrence, Paul R., and Jay W.Lorsch. 1967. *Organization and Environment: Managing Differentiation and Integration*. Boston: Harvard University, Graduate School of Business Administration, Division of Research.

Ledwaba, P., & Nhlengetwa, K. (2016). When policy is not enough: Prospects and challenges of artisanal and small-scale mining in South Africa. *Journal of Sustainable Development Law and Policy (The), 7*(1), 25. doi:10.4314/jsdlp.v7i1.2

Lee, J. H., Wu, R., & Fan, L. (2017). Influence on the Use Intention of User's Traits in China Market. *The Journal of Business Economics and Environmental Studies*, 7(2), 21-29.

Lee, K. H., Cin, B. C., & Lee, E. Y. (2016). Environmental responsibility and firm performance: the application of an environmental, social and governance model. *Business Strategy and the Environment*, 25(1), 40-53.

Lee, Y. N. (2015). *Expanding Understanding Of The Innovation Process: R&D And Non-R&D Innovation* (dissertation). School of Public Policy Georgia Institute of Technology.

Leonard-Barton (1992). "The Factory as a Learning Laboratory," *Sloan Management Review*, Vol. 34, No.1, pp. 23-38

Levitt, B. and March, J.G. (1988), "Organizational learning", *Annual Review of Sociology*, Vol.14, pp. 319-340.

Li, C. R., Lin, C. J., & Chu, C. P. (2008). The nature of market orientation and the ambidexterity of innovations. *Management Decision*, 46(7), 1002–1026

Li, J. J. (2005). The formation of managerial networks of foreign firms in china: The effects of strategic orientations. *Asia Pacific Journal of Management*, 22(4), 423-443.

Li, J., Liu, M., & Liu, X. (2016). Why do employees resist knowledge management systems? An empirical study from the status quo bias and inertia perspectives. *Computers in Human Behavior*, 65(4), 189–200.

Li, X., Wu, Q., Holsapple, C. W., & Goldsby, T. (2017). An empirical examination of firm financial performance along dimensions of supply chain resilience. *Management Research Review.*40(3) pp. 254-269.

Lichtenthaler, U. (2009). Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes. *Academy of Management Journal*, 52(4), 822–846.

Lieb, S. (1991). *Principles of adult learning, Phoenix*, AZ: Vision – South Mountain Community College.

Liker J. K., Haddad C. J., Karlin J. (1999). *Perspectives on technology and work organization*. Annu. Rev. Sociol. 25, 575–596. 10.1146/annurev.soc.25.1.575.

Lin, Y., & Wu, L. (2014). Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *Journal of Business Research*, 67(3), 407-413.

Lind, J., & Kraus, K. 2010. The Impact of the Corporate Balanced Scorecard on Corporate Control. *Management Accounting Research*, 21(1): 265–277.

Lingaraja, K., Selvam, M., Vasanth, V., & Ramkumar, R. R. (2015). Long-run overseas portfolio diversification benefits and opportunities of Asian emerging stock markets and developed markets. *International Journal of Economics and Financial Issues*, 5(2).

Lisi, I. E. (2015). Translating environmental motivations into performance: The role of environmental performance measurement systems. *Management Accounting Research*, 29(4), 27 44.

Llewellyn, S. (2003), “What counts as theory in qualitative management and accounting research? Introducing five levels of theorizing”, *Accounting, Auditing & Accountability Journal*, Vol. 16, No. 4, pp. 662-708.

Lopez-Gamero, M. D., Claver-Cortes, E., & Molina-Azonrin, J. F. (2008). Complementary resources and capabilities for an ethical and environmental management: A qualquan study. *Journal of Business Ethics*, 82(3), 701–732

Lowe, E. A. (2019). On the idea of a management control system: integrating accounting and management control. *Management Control Theory*, 63.

Lu, B., Fan, W., & Zhou, M. (2016). Social presence, trust, and social commerce purchase intention: An empirical research. *Computers in Human Behavior*, 56, 225-237.

Lu, S., Shang, Y., Li, W., Wu, X., & Zhang, H. (2018). Basic theories and methods of watershed ecological regulation and control system. *Journal of Water and Climate Change*, 9(2), 293-306.

Lueg, R., & Radlach, R. (2016). Managing sustainable development with management control systems: A literature review. *European Management Journal*, 34(2), 158–171

Lumpkin, G. & Dess, G.G., 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), pp. 135–172.

Luthans, F., & Davis, T. (1979). Behavioral self-management (BSM): The missing link in managerial effectiveness. *Organizational Dynamics*, 8, 42-60.

Maduku, D.K., Mpinganjira, M. & Duh, H., 2016, 'Understanding mobile marketing adoption intention by South African SMEs: A multi-perspective framework', *International Journal of Information Management* 36(5), 711-723. https://doi.org/10.1016/j.ijinfomgt.2016.04.018.

Mahoney, M. J., & Arnkoff, D. B. (1978). *Cognitive and self-control therapies*. In S. L. Garfield & A. E. Borgin (Eds.), Handbook of psychotherapy and therapy change (pp. 689-722). New York: Wiley.

Mahoney, M. J., & Arnkoff, D. B. (1979). *Self- management: Theory, research, and application*. In J. P. Brady & D. Pomerleau (Eds.), Behavioral medicine: Theory and practice (pp. 75-96). Baltimore: Williams and Williams.

Makkonen, H., Pohjola, M., Olkkonen, R., & Koponen, A. (2014). Dynamic capabilities and firm performance in a financial crisis. *Journal of Business Research*, 67(1), 2707-2719.

Manz, C. C. (1986). Self-leadership: Toward an expanded theory of self-influence processes in organizations. *Academy of Management Review*, 11, 585-600.

Manz, C. C., & Neck, C. P. (2004). *Mastering self- leadership: Empowering yourself for personal excellence (Third edition)*. Upper Saddle River, NJ: Prentice Hall.

Manz, C. C., & Sims, H. P., Jr. (2001). *The new Super Leadership: Leading others to lead themselves*. San Francisco, Berrett-Koehler.

March, J.G. (1991), "Exploration and exploitation in organizational learning", *Organization Science,* Vol. 2 No. 1, pp. 71-87.

Margarita, A. B., Fernando, B., Bayo-moriones, A., & Lera-lo, F. (2013). Perceived performance effects of ICT in manufacturing SMEs. *Industrial Management & Data Systems*, 113(1), 117–135. doi:10.1108/02635571311289700.

Markham, S. E., & Markham, I. S. (1998). *Self- management and self-leadership reexamined: A levels of analysis perspective*. In F. Dansereau & F. J. Yammarino (Eds.), Leadership: The multiple-level approaches, classical and new wave (pp. 193-210). Stanford, CT: JAI Press.

Marsh, H. W., Hau, K.-T., & Grayson, D. (2005). Goodness of Fit in Structural Equation Models. In A. Maydeu-Olivares & J. J. McArdle (Eds.), *Contemporary psychometrics: A festschrift for Roderick P. McDonald* (pp. 275–340). Lawrence Erlbaum Associates Publishers.

Martínez-Leon, I.M. and Martínez-García, J.A. (2011), "The influence of organizational structure on organizational learning", *International Journal of Manpower*, Vol. 32 Nos 5/6, pp. 537-566.

Matte, R. (2019). Original Paper Analysis of the East African Community Integration Process as an Opportunity for Uganda's Medium-to-Long-Term Development. *Economics*, 2(1).

McFarlane, D., Giannikas, V., Wong, A. C., & Harrison, M. (2013). Product intelligence in industrial control: Theory and practice. *Annual Reviews in Control*, 37(1), 69-88.

McNamee, T., Pearson, M., & Boer, W. (2015). *Africans Investing in Africa: Understanding Business and Trade, Sector by Sector* (2015th ed.). Palgrave Macmillan. https://doi.org/10.1057/9781137542809

Megginson, L. C. .; Mosley, D. C. .; Pietri Junior, P. (1998.) *Administração conceitos e aplicações*. 4. ed. São Paulo: Saraiva.

Merchant, K. A., & Otley, D. T. (2007). *A review of the literature on control and accountability*. Handbook of Management Account Research. (Ed.) Chapman, CS, Hopwood, AG, Shields, MD, 785-804.

Metaxiotis, K., 2009, 'Exploring the rationales for ERP and knowledge management integration in SMEs', *Journal of Enterprise Information Management* 22(1/2), 51-62. https://doi.org/10.1108/17410390910922822.

Meyers, M. A., McKittrick, J., & Chen, P. Y. (2013). Structural biological materials: critical mechanics-materials connections. *Science*, 339(6121), 773-779.

Mihalic, T., & Bousinakis, D. (2013). *ICT as a new competitive advantage factor – Case of small transitional hotel sector*. Economic and Business Review, 15(1), 33–57.

Millsap, R. E. (2012). Statistical approaches to measurement invariance. Routledge.

Min, W. Z., Ling, K. C., & Tan, P. H. (2016). The effects of technological innovation, organizational innovation and absorptive capacity on product innovation: A structural equation modeling approach. *Asian Social Science*, 12(1), 199.

Mishra, A. A., & Shah, R. (2009). In union lies strength: collaborative competence in new product development and its performance effects. *Journal of Operations Management*, 27(4), 324–338.

Mody, A. (1993). Learning through alliances. *Journal of Economic Behavior & Organization*, 20(2), 151-170.

Moghadam, M. D., & Jafari, M. (2015). The role of financial leverage in the performance of companies listed in the stock exchange. *Indian Journal of Natural Sciences*, 5(30), 7402-7657.

Motella, B., Pini, M., & Presti, L. L. (2012, December). *GNSS interference detector based on Chi-square Goodness-of-fit test*. 6th ESA Workshop on Satellite Navigation Technologies (pp. 1-6).

Motowidlo, S. J., Borman, W. C., & Schmit, M. J. (1999). Performance assessment in unique jobs. In D.R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of performance*, 56-86, San Francisco: Jossey-Bass.

Mpanju, A. K. (2019). International Diversification Impact On Firm Performance: A Study Of The East African Community (Eac) Firms. *Proceedings of the 50th International Academic Conference, Paris,* 185-202. doi:10.20472/iac.2019.050.027

Muchhal, D. S (2014). HR Practices and Job Performance. IOSR *Journal of Humanities and Social Science* (IOSR-JHSS), 19(4), 55-61.

Mwakesi, I., Wahome, R., & Ichang'I, D. (2020). Mining impact on communities' livelihoods: A case study of Taita Taveta County, Kenya. *AIMS Environmental Science, 7*(3), 286-301. doi:10.3934/environsci.2020018.

Naranjo-Gil, D. & Hartmann, F., 2007a. How CEOs use management information systems for strategy implementation in hospitals. *Health Policy*, 81(1), pp. 29– 41.

Naranjo-Gil, D. & Hartmann, F., 2007b. Management accounting systems, top management team heterogeneity and strategic change. *Accounting, Organizations and Society*, 32(7), pp. 735–756.

Narver, J.C. & Slater, S.F., 1990. The Effect of a Market Orientation on Business Profitability. *Journal of Marketing*, 54(4), pp. 20–35.

Nelson R, Winter S. 1982. An Evolutionary Theory of Economic Change. Belknap Press: Cambridge, MA. Penrose ET. 1959. *The Theory of the Growth of the Firm*. Wiley: New York.

Nichols T., Walters, D. & Tasiran A. (2007). Trade Unions, Institutional Mediation and Industrial Safety: Evidence from the UK. Journal of Industrial Relations, 49(2), p. 211-225

Niebel, T., 2018, 'ICT and economic growth - Comparing developing, emerging and developed countries', *World Development* 104, 197-211. https://doi.org/10.1016/j.worlddev.2017.11.024.

Nilsson, F. (2002). Recent advances in performance management: The nordic case. *European Management Journal*, 20(3), 235–246

Nitzsche, P., Wirtz, B. W., & Goettel, V. (2016). Innovation success in the context of inbound open innovation. *International Journal of Innovation Management*, 20(2).

Nkundabanyanga, S. K. (2016), "Board governance, intellectual capital and firm performance Importance of multiplicative effects", *Journal of Economic and Administrative Sciences*, Vol.32 No.1, pp.20-45

Nolan, E. M., & Morley, M. J. (2014). A test of the relationship between person–environment fit and cross-cultural adjustment among self-initiated expatriates. *The International Journal of Human Resource Management*, 25(11), 1631-1649.

Norins, H. (1990). *The Young & Rubicam traveling creative workshop*. Englewood Cliffs, NJ: Prentice-Hall.

Novac-ududec, C., Enache, C., & Sbughea, C. (2011). The IT impact on the productivity and the organizational performance of firms in Romania. A model of empirical analysis. *In International Conference "risk in contemporary Economy"* (12th ed., pp. 177–183). Galati Romania: University of Galati.

Ntemana, T. J., & Olatokun, W. (2012). Analyzing the influence of diffusion of innovation attributes on lecturers' attitudes toward information and communication technologies. *Journal on Humans in ICT Environments*, 8(2), 179–197. doi:10. 17011/ht/urn.201211203034.

Nyamita, M. O. (2014). *Factors influencing debt financing and its effects on financial performance of state corporations in Kenya* (Doctoral dissertation).

Obrad, C., & GherheȘ, V. (2018). A human resources perspective on responsible corporate behavior. Case study: the multinational companies in Western Romania. *Sustainability*, 10(3), 726.

Ohr, R.C. and Mattes, F. (2013a), "Balancing innovation via organizational ambidexterity – Part 3", *Innovation Management Online Concepts.*

Opperman CS (2002). *Tropical Business Issues*. Partner Price Water House Coopers.

O'Reilly III, C. A., and Tushman, M. (2008), 'Ambidexterity as a dynamic capability: Resolving the innovator's dilemma', *Research in Organizational Behavior*, vol. 28, pp. 185-206.

Orth, P. B. (2015). *Organizational Change In The United States Forest Service: The Role Of Community Collaboration* (dissertation). Colorado State University.

Orzoco, D. B. (2016). *Understanding the impact of Management control system over capabilities and organizational performance, under the influence of perceived environmental uncertainty* (dissertation). International Doctorate Program in Entrepreneurship and Management, Department of Business, Universitat Autonoma de Barcelona.

Otley, D., 1980. The contingency theory of management accounting: Achievement and prognosis. *Accounting, Organizations and Society*, 5(4), pp. 413–428.

Otley. D., (1980), *'Thc contingency theory of management accounting: achievemcnt and prognosis'*, Accounting, Organizations and Society. v. 5. p. 413-428.

Ouchi, W.G. (1975). *Markets, bureaucracies and clans*. Adminis, 25, 129–142.

Ouchi, W.G. (1979). A conceptual framework for the design of organizational control mechanisms. *Management Science*, 25(9).

Parthiban, S., & Gajivaradhan, P. (2020). A comparative study of chi-square goodness-of-fit under fuzzy environments. *International Knowledge Sharing Platform*, 6(2).

Parker S. K., van den Broeck A., Holman D. (2017). *Work design influences: a synthesis of multilevel factors that affect the design of jobs.* Acad. Manage. Ann. 11, 267–308. 10.5465/annals.2014.0054.

Pathak, S. D., Day, J. M., Nair, A., Sawaya, W. J., & Kristal, M. M. (2007). Complexity and adaptivity in supply networks: Construct supply network theory using a complex adaptive systems perspective. *Decision sciences*, 38(4), 547-580.

Penrose, E.T. (1959). *The theory of the growth of the firm*. New York: Wiley.

Penrose, E.T., 1995. *The Theory of the Growth of the Firm 2nd ed.*, New York: oxford University Press.

Perrow, C. (1972). *Complex Organizations a Critical Essay*, McGraw-Hill Inc.

Persaud, A.W., Telmer, K.H., Costa, M. 2017: Artisanal and small-scale gold mining in Senegal: Livelihoods, customary authority, and formalization. *Society and Natural Resources*, 30, 980–93.

Pervan, M., Curak, M., &PavicKramaric, T. (2017). The Influence of Industry Characteristics and Dynamic Capabilities on Firms' Profitability. *International Journal of Financial Studies*,6(1),4.

Peteraf, M.A. (1993). The Cornerstones of Competitive Advantage: A Resource -Based View. *Strategic Management Journal*, 14(3), 179–91.

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: a resource dependence perspective* New York: Harper and How.

Pisano GP. 1994. Knowledge, integration, and the locus of learning: an empirical analysis of process development. *Strategic Management Journal*, Winter Special Issue 15: 85–100.

Porter, M. E. (1990). *The competitive advantage of nations*. Harvard Business Review, 68(2), 7393.

Porter, M.E., 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York, NY: The free press.

Post, J.E., Preston, L.E., & Sachs, S. (2002), Managing the extended enterprise: the new stakeholder view, *California Management Review*, 45 (1), 6–28.

Prahalad CK, Hamel G. 1990. The core competence of the corporation. *Harvard Business Review* 68(3): 79–91.

Prahalad, C. K., & Hamel, G. (1994). Strategy as a field of study: Why search for a new paradigm? *Strategic Management Journal*, 15(S2), 5-16.

Projectsiq.co.za. (2020). Mining in East Africa. [online] Available at:https://www.projectsiq.co.za/mining-in-east-africa.htm [Accessed 8 Mar. 2020].https://www.projectsiq.co.za/mining-in-east-africa.htm

Protogerou, A., Caloghirou, Y., & Lioukas, S. (2012). Dynamic capabilities and their indirect impact on firm performance. *Industrial and Corporate Change*,21(3), 615-647.

Pujiati, D., Misdiyono, M., & Margianti, E. S. (2019). Meta Analysis: Management Control System, Strategy, Company Performance. *APTIKOM Journal on Computer Science and Information Technologies, 4*(3), 96-104. doi:10.11591/aptikom.j.csit.15

Quessy, J. F., Rivest, L. P., & Toupin, M. H. (2019). Goodness-of-fit tests for the family of multivariate chi-square copulas. *Computational Statistics & Data Analysis*, 140, 21-40.

Qureshi, M. I., Rasli, A. M., Jusoh, A., & Kowang, T. O. (2015). Sustainability: A new manufacturing paradigm. *Jurnal Teknologi*, 77(22).

Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. (2009). Organizational ambidexterity: balancing exploitation and exploration for sustained performance. *Organization Science*, 20(4), 685–695.

Ramanathan, R. (2018). Understanding complexity: The curvilinear relationship between environmental performance and firm performance. *Journal of Business Ethics*, 149(2), 383-393.

Raza, S. A., Umer, A., & Shah, N. (2017). New determinants of ease of use and perceived usefulness for mobile banking adoption. *International Journal of Electronic Customer Relationship Management*, 11(1), 44-65.

Ripollés, M. & Blesa, A., 2005. Relación entre la orientación al mercado y la orientación emprendedora: su influencia en el rendimiento de la empresa. *Revista europea dedirección y economía de la empresa*, 14(3), pp. 165–180.

Rizvi, Y.S. and Garg, R. (2021), "The simultaneous effect of green ability-motivation-opportunity and transformational leadership in environment management: the mediating role of green culture", *Benchmarking: An International Journal*, Vol. 28 No. 3, pp. 830-856. https://doi.org/10.1108/BIJ-08-2020-0400

Roach, D. C., Ryman, J. A., & Makani, J. (2016). Effectuation, innovation and performance in SMEs: An empirical study. *European Journal of Innovation Management*, 19(2), 214–238.

Roberts, P. W., & Amit, R. (2003). The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. *Organization Science*, 14(2), 107–122

Rodriguez, M., Doloreux, D., & Shearmur, R. (2017). Variety in external knowledge sourcing and innovation novelty: Evidence from the KIBS sector in Spain. Technovation, 68, 35–43.

Rogers, E. M. (2003). *Elements of diffusion. Diffusion of innovations* (5th ed). New York, NY: Macmillan Publishing Co. Inc. https://doi.org/82-70998.

Rogers, E., 1995, *Diffusion of innovations*, 4th edn., The Free Press, New York.

Rosen, M. A., & Kishawy, H. A. (2012). Sustainable manufacturing and design: Concepts, practices and needs. *Sustainability,* 4(2), 154-174.

Rothaermel, F. T. (2015). Strategic management. McGraw-Hill Education.

Rötzel, P. G., Stehle, A., Pedell, B., & Hummel, K. (2019). Integrating environmental management control systems to translate environmental strategy into managerial performance. *Journal of Accounting & Organizational Change, 15*(4), 626-653. doi:10.1108/jaoc-08-2018-0082.

Ruoslahti, H. (2018). *Co-creation of knowledge for innovation requires multi-stakeholder public relations. In public relations and the power of creativity: Strategic opportunities, innovation and critical challenges*. pp. 115–133. Emerald Publishing Limited.

Rustam, J. S. (2017). *The Effect of Nursing Comfort Care Integrating with the Holy Qur'a Recitation on Comfort in Muslim Patients With mechanical Ventilation*.Prince of Songkla University.

Saad, M. A. S., & Zhengee, T. (2016). The impact of organizational factors on financial performance: Construct a theoretical model. *International Journal of Management science and Business Administration*, 2(7), 51-56.

Sadok, M., Chatta, R. & Bednar, P., 2016, 'ICT for development in Tunisia: "Going the last mile"', *Technology in Society* 46, 63-69.

Sadok, M., Chatta, R. & Bednar, P., 2016, 'ICT for development in Tunisia: "Going the last mile"', *Technology in Society* 46, 63-69.

Saeidi, S. P., Sofian, S., Saeidi, P., Saeidi, S. P., & Saaeidi, S. A. (2015). How does corporate social responsibility contribute to Firm performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *Journal of business research*, 68(2), 341-350.

Saif, N. M. A. (2015). How does marketing strategy affectFirm performance? Implementation of marketing strategy for firm success. *International Journal of Innovation and Economic Development*, 1(3), 7-15.

Saleem, H. (2015). The impact of leadership styles on job satisfaction and mediating role of perceived organizational politics. *Procedia - Social and Behavioral Sciences*, 172, 563–569. doi:10.1016/j.sbspro.2015.01.403

Savall, H. (1975). Work and People: *An Economic Evaluation of Job Enrichment*, forward by Ansoff, I., New York: Oxford University Press.

Savall, H. (2003a). An Updated Presentation of the Socio-Economic Management Model. *Journal of Organizational Change Management*, 16(1), 33-48.

Savall, H. (2003b). International Dissemination of the Socio-Economic method. *Journal of Organizational Change Management*, 16(1), 107-115.

Savall, H. (2007). *ISEOR's Socio-Economic Method: A Case of Scientific Consultancy. Socio-Economic Intervention in Organizations*. The Intervener-Researcher and the Seam Approach to Organizational Analysis. Buono, A,. & Savall, H. ed., Information Age Publishing, 1-32.

Savall, H., and Zardet, V. (2008). *Mastering Hidden Costs and Socio-Economic Performance*. Information Age Publishing.

Savall, H., Zardet, V., Bonnet, M., and Moore, R. (2001). A System-wide, Integrated Methodology for Intervening in Organizations: The ISEOR Approach. Current Trends in Management Consulting. Buono, A.F. (Ed.), *Information Age Publishing*, 88-104.

Savall, H., Zardet, V., Bonnet, M., and Moore, R. (2001). A System-wide, Integrated Methodology for Intervening in Organizations: *The ISEOR Approach. Current Trends in Management Consulting*. Buono, A.F.(Ed.), Information Age Publishing, 88-104.

Schaltegger, S., & Wagner, M. (Eds.). (2017). *Managing the business case for sustainability: The integration of social, environmental and economic performance*. Routledge.

Schechner, R. (2004). *Performance theory*. Routledge.

Schendel, D. (1996). Evolutionary perspectives on strategy. Strategic Management Journal, 17(S1), 1–4.

Schermann, M., Wiesche, M., & Krcmar, H. (2012). The role of information systems in supporting exploitative and exploratory management control activities. *Journal of Management Accounting Research*, 24(1), 31-59.

Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, 9(3), 209-216.

Schildt, H. A., Maula, M. V., & Keil, T. (2005). Explorative and exploitative learning from external corporate ventures. *Entrepreneurship Theory and Practice*, 29(4), 493–515.

Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling* (3rd ed.). NY: Routledge.

Schumpeter, J. A. (1939). *Business Cycles: A Theoretical, Historical, And Statistical Analysis of the Capitalist Process*. New York: McGraw-Hill Book Company. https://doi.org/https://doi.org/10.1086/ahr/46.1.96.

Scott, W. R. (2001). Institutions and organizations. Thousand Oaks: Sage Publication

Seligman, M. E. P. (1991). *Learned optimism*. New York: Alfred Knopf.

Selvam, M., Gayathri, J., Vasanth, V., Lingaraja, K., & Marxiaoli, S. (2016). Determinants of Firm Performance: A Subjective Model. *International Journal of Social Science Studies, 4*(7). doi:10.11114/ijsss.v4i7.1662.

Shan, J., & Jolly, D. R. (2013). Technological innovation capabilities, product strategy, and firm performance: The electronics industry in China. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, 30(3), 159-172.

Shankar, P. M. (2019). Pedagogy of chi‐square goodness of fit test for continuous distributions. *Computer Applications in Engineering Education*, 27(3), 679-689.

Shapiro, B. (2016). Using traditional narratives and other narrative devices to enact humanizing business practices. *Journal of Business Ethics*, 139(1), 1–19

Shaw, E., O'Loughlin, A., & McFadzean, E. (2005). Corporate entrepreneurship and innovation part 2: A role- and processbased approach. *European Journal of Innovation Management*, 8(4), 393–408. doi:10.1108/14601060510627786.

Shaw, N. (2014). The mediating influence of trust in the adoption of the mobile wallet. *Journal of Retailing and Consumer Services,* 21(4), 449-459.

Shawn, L. B., Andrew, C. W., Suresh, K., & Thomas, M. J. (1999). Does stakeholder orientation matter? The relationship between stakeholder management models and firm financial performance. *Academy of Management Journal, 42*(5), 488-506.

Shin, Y. C., & Xu, C. (2017). *Intelligent systems: modeling, optimization, and control*. CRC press.

Shin, Y., Sung, S. Y., Choi, J. N., & Kim, M. S. (2015). Top management ethical leadership and firm performance: Mediating role of ethical and procedural justice climate. *Journal of Business Ethics*, 129(1), 43-57.

Simerly, R., Li, M., & Bass, K. (2012). CEO compensation and corporate social performance: A longitudinal examination.

Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Boston: Harvard Business School Press.

Simons, R. (2000). *Performance measurement and control systems for implementing strategy*. New Jersey, NJ: Prentice-Hall.

Sims, H. P., Jr., & Manz, C. C. (1996). *Company of heroes: Unleashing the power of self-leadership*. New York: Wiley.

Sinkula, J. M., Baker, W. E., & Noordewier, T. (1997). A framework for market-based organizational learning: linking values, knowledge, and behavior. *Journal of the Academy of Marketing Science*, 25(4), 305–318.

Sitkin SB. 1992. *Learning through failure: the strategy of small losses, In Research in Organizational* Copyright 2000 John Wiley & Sons, Ltd. Strat. Mgmt. J., 21: 1105–1121 (2000) Behavior, Staw BM, Cummings LL (eds.). Vol. 14: JAI Press: Greenwich, CT; 231–266.

Soares, M. D., & Perin, M. G. (2019). Entrepreneurial orientation and firm performance: An updated meta-analysis. *RAUSP Management Journal, 55*(2), 143-159. doi:10.1108/rausp-01-2019-0014

Sondakh, J. J. (2017). Behavioral intention to use e-tax service system : an application of technology acceptance model. *European Research Studies Journal*, 20(2A), 48-64.

Song, X. M., & Parry, M. E. (1997). A cross-national comparative study of new product development processes: Japan and the United States. *The Journal of Marketing*, , 1-18.

Song, Y., Feng, T., & Jiang, W. (2017). The affectof green external integration on Firm performance: does firm size matter?. *Sustainability*, 9(8), 1328.

Srinivasan, R., Lilien, G. L., & Rangaswamy, A. (2002). Technological opportunism and radical technology adoption: An application to e-business. *Journal of Marketing*, 66(3), 47-60.

Srivastava, M. S., & Kubokawa, T. (2013). Tests for multivariate analysis of variance in high dimension under non-normality. *Journal of Multivariate Analysis*, 115, 204-216.

Stahl, G. K., Brewster, C. J., Collings, D. G., & Hajro, A. (2020). Enhancing the role of human resource management in corporate sustainability and social responsibility: A multi-stakeholder, multidimensional approach to HRM. *Human Resource Management Review*, 30(3), 100708..

Stoner, J. and Freeman, R.E. (1985), *Administraç̃o*, Prentice-Hall, Rio de Janeiro.

Stup, R. (2003). Control the factors that influence employee success. *Managing the Hispanic Workforce Conference*. Cornell University and Penneylvania State University.

Suwati, Magdalena, M., Gagah, E. (2016). Influence of motivation work, career development and cultural organization on the job satisfaction and implications on the performance of employees. *Journal of Management*, 2(2).

Swarbrooke, J., & Page, S. J. (2012). *Development and management of visitor attractions*. Routledge.

Tan, T., He, Z., & Sun, Z. (2010). Efficient and robust segmentation of noisy iris images for non-cooperative iris recognition. *Image and vision computing*, 28(2), 223-230.

Tao, F., Liu, X., Gao, L. and Xia, E. (2016), "Do Cross-border Mergers and Acquisitions increase short term market Performance? The case of Chinese firms", *International Business Review*, Vol.26 No.1, pp.189-202.

Tarute, A. & Gatautis, R., 2014, 'ICT impact on SMEs performance', *Procedia - Social and Behavioral Sciences* 110(0), 1218-1225. https://doi.org/10.1016/j.sbspro.2013.12.968.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319-1350.

Teece, D. J. (2009). *Dynamic capabilities and strategic management: Organizing for innovation and growth*. Oxford: Oxford University Press.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Teece, D., &Leih, S. (2016). Uncertainty, innovation, and dynamic capabilities: An introduction. *California Management Review*, 58(4), 5-12.

Teece, D.J. (2007) Explicating dynamic capabilities: the nature and micro foundations of (sustainable) enterprise performance, *Strategic Management Journal*. , 28 (13) pp. 1319-1350.

Teece, D.J., Pisano, G., & Shuen A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509-533.

Teece, David & Pisano, Gary. (1994). The Dynamic Capabilities of Firms: An Introduction. *Industrial and Corporate Change*. 3. 537-556. 10.1093/icc/3.3.537-a.

Teece, David. (2010). *Business Models, Business Strategy and Innovation*. Long Range Planning. 43. 172-194. 10.1016/j.lrp.2009.07.003.

Tella, Adeyinka; Ayeni, C. O.; Popoola, S. O. (2007). Work Motivation, Job Satisfaction, and Organisational Commitment of Library Personnel in Academic and Research Libraries in Oyo State, Nigeria. *Library Philosophy and Practice* (e- journal), 9(2).

Theodorakopoulos, N., Preciado, D. J. S., & Bennett, D. (2012). Transferring technology from university to rural industry within a developing economy context: The case for nurturing communities of practice. *Technovation*, 32(9-10), 550-559.

Thompson J. D. (1967). *Organizations in Action*. Mcgraw-Hill Inc.

Thompson, B 2000, Ten commandments of structural equation modelling, in L. Grimm & P. Yarnell (eds.), *Reading and understanding more multivariate statistics*, Washington, DC: American psychological Association.

Thompson, J. D. (1967).*Organizations in action*. New York: McGraw Hill.

Thompson, J. D. *Selling: a managerial and behavioral science analysis*. [s.l.] New York: McGraw-Hill, 1973.

Thompson, J. D., & Bates, F. L. (1957). Technology, Organization, and Administration. *Administrative Science Quarterly, 2*(3), 325. doi:10.2307/2391002.

Thompson, T. S. H., (1992) *'Unempirical study of linkages between business planning and information systems planning*'. Dissertation Proposal. University of Pittsburgh, September.

Thomson, A. MacDonald (2001), Corporate Communication Standards, Practice and Issues. *Access to Information: A Key to Building Trust in the Minerals Sector*. MMSD, 2001, 32. IIED publication

Thoresen, C. E., & Mahoney, M. J. (1974). *Behavioral self-control*. New York: Holt, Rinehart, and Winston.

Tidd, J., & Bessant, J. R. (2018). *Managing innovation: integrating technological, market and organizational change*.John Wiley & Sons.

Tidd, J., & Bessant, J. R. (2020). *Managing innovation: integrating technological, market and organizational change*. Wiley.

Tigabu, A. D., Berkhout, F., & van Beukering, P. (2015). Technology innovation systems and technology diffusion: Adoption of bio-digestion in an emerging innovation system in Rwanda. *Technological Forecasting and Social Change*, 90, 318-330.

Ting-Toomey, S. (2015). Identity negotiation theory. *The international encyclopedia of interpersonal communication*, 1-10.

Tinker, A. M., & Lowe, E. A. (1978). A Model of the Environment of Organizations: Theory and Evidence of Regulating "Jumpy" F-Sets. *Applied General Systems Research,* 831-844. doi:10.1007/978-1-4757-0555-3_64

Todaro, N. M., Daddi, T., Testa, F., & Iraldo, F. (2019). Organization and management theories in environmental management systems research: A systematic literature review. *Business Strategy & Development, 3*(1), 39-54. doi:10.1002/bsd2.77

Tornatzky, L., and Fleischer, M. (1990), "*The process of technology innovation*", Lexington, M.A: Lexington Books.

Tornatzky, L.G., Fleischer, M. & Chakrabarti, K., 1990, *Processes of technological innovation*, Lexington Books, Lexington, MA.

Trostmann, E. (2019). *Water hydraulics control technology*. Routledge.

Tsai, W. (2002). Social structure of "coopetition" within a multiunit organization: coordination, competition, and intra organizational knowledge sharing. *Organization Science*, 13(2), 179–190.

Tsukamurella Collins et al., 1988 in GBIF Secretariat (2021). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2022-04-10.

Tucker, B., Thorne, H., & Gurd, B. (2009). Management control and strategy: What's been happening? *Journal of Accounting Literature*, 28(1), 123–163.

Tushman, M. and Nadler, D. (1986) Organizing for Innovation. *California Management Review*, 28, 74-92.

Tworek, H. J. (2019). *News from Germany: The competition to control world communications, 1900–1945*. Harvard University Press.

Uneca.org. 2020. Assessment Of Mineral Regimes In The East African Community | *United Nations Economic Commission For Africa*. [online] Available at:

<https://www.uneca.org/publications/assessment-mineral-regimes-east-african-community> [Accessed 22 April 2020].

United Nations. Economic Commission for Africa. Special Initiatives Division. African Minerals Development Center; African Union Commission (2017-01). *Assessment of mineral regimes in the East African community: aligning frameworks with the African mining vision.* Addis Ababa:. © UN. ECA,. https://hdl.handle.net/10855/23560"

Urabe, K. (1988). *Innovation and management: International comparisons;* Berlin: De Gruyter.

Uzkurt, C., Kumar, R., Kimzan, H. S., & Eminoğlu, G. (2013). Role of innovation in the relationship between organizational culture and firm performance. *European Journal of innovation management*.6 (3).

Valdez-Juárez, L. E., & Castillo-Vergara, M. (2020). Technological capabilities, open innovation, and eco-innovation: Dynamic capabilities to increase corporate performance of smes. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 8. https://doi.org/10.3390/joitmc7010008.

Vanhaverbeke, W., Beerkens, B., Gilsing, V., & Duysters, G. (2004). Explorative and exploitative learning strategies in technology-based alliance networks. *Academy of Management Best Conference Paper, J1–J6 working paper.*

Vasco , D. F. (2011). *Successful Organizations From the theoretical research to the business point of view* (dissertation). Instituto Universitario de Lisboa, ISCTE Business School.

Velicer WF, Fava JL. (1998). Effects of variable and subject sampling on factor pattern recovery. *Psychological Methods* ;3:231–251.

Venkatraman, N. and Ramanujam, V. 1986. "Measurement of Business Performance in Strategy Research : A Comparison of Approaches." *Academy of Management Review*. 11 : 801-814.

Villar, C., Alegre, J., &Pla-Barber, J. (2014). Exploring the role of knowledge management practices on exports: A dynamic capabilities view. *International Business Review*, 23(1), 38-44.

Vohra, V. (2015), "Organizational environments and adaptive response mechanisms in India", *Journal of Indian Business Research*, Vol. 7 No. 1, pp. 21-44. https://doi.org/10.1108/JIBR-01-2014-0001.

Von Grebmer, K., Bernstein, J., de Waal, A., Prasai, N., Yin, S., & Yohannes, Y. (2015). *Global hunger index: armed conflict and the challenge of hunger*. Intl Food Policy Res Inst.

Voss, G. B., & Voss, Z. G. (2000). Strategic orientation and firm performance in an artistic environment. *Journal of Marketing*, 64(1), 67-83.

Vuong, N. B., Vu, T. T., & Mitra, P. (2017). Impact of Capital Structure on Firms Financial Performance: Evidence from United Kingdom. *Journal of Finance & Economics Research, 2*(1), 18-32. doi:10.20547/jfer1702102.

Wadhwa, P., McCormick, M., & Musteen, M. (2017). Technological innovation among internationality active SMEs in the Czech economy. *European Business Review*.

Wagner, A.J. 1994. “Participation’s Effects on Performance and Satisfaction: A Reconsideration of Research Evidence.” *Academy of Management Review*. 19: 312-330.

Walecka-Jankowska, K. (2015). Relationship between Knowledge Management and Innovation. *Social Sciences* (1392-0758), 90(4).

Walker, B. W., & Caprar, D. V. (2020). When performance gets personal: Towards a theory of performance-based identity. *Human Relations*, 73(8), 1077-1105.

Wambugu, A. W., & Gichira, R. (2015). The relationship between proactiveness and performance of small and medium agro processing enterprises in Kenya. *International Journal of Economics, Commerce and Management*, III(12), 58–72.

Wang, C. L., Senaratne, C., &Rafiq, M. (2015). Success traps, dynamic capabilities and firm performance. *British Journal of Management*, 26(1), 26-44.

Wang, D.S. (2020), "Association between technological innovation and firm performance in small and medium-sized enterprises: The moderating effect of environmental factors", *International Journal of Innovation Science*, Vol. 11 No. 2, pp. 227-240. https://doi.org/10.1108/IJIS-04-2018-0049.

Wang, X.; Bao, H. Alliance portfolios and firm performance: The moderating role of environmental dynamics. *Industrial Management and Data Systems*, v. 117, n. 8, p. 1550–1566, 2017.

Wanichbancha, K., (2011). *Statistics for research* (6th ed.). Bangkok: Chulalongkorn University.

Wanichbancha, K., (2013). *Structural equation model analysis (SEM) with AMOS* (1st ed.). Bangkok: Chulalongkorn University

Warren Jr, J. D., Moffitt, K. C., & Byrnes, P. (2015). How Big Data will change accounting. *Accounting Horizons*, 29(2), 397-407.

Weerasekarage Gayashan Madhuranga, W. (2018). *Perceived quality of internal control system in public sector organization under control eastern provincial council in Sri Lanka*. Second international research Symposium 83-86.

Weng, F., Yang, R. J., Ho, H. J., & Su, H. M. (2018). A TAM-based study of the attitude towards use intention of multimedia among school teachers. *Applied System Innovation*, 1(3), 36.

Weng, H. H., Chen, J. S., & Chen, P. C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability*, 7(5), 4997-5026.

Wernefelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.

Wernerfelt B. 1995. The resource-based view of the firm: ten years after. *Strategic Management Journal* 16(3): 171–174

Wernerfelt, B., 1984. A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2), pp. 171–180.

Wicki, S., & Hansen, E. G. (2017). Clean energy storage technology in the making: An innovation systems perspective on flywheel energy storage. *Journal of cleaner production*, 162, 1118-1134.

Widener, S.K., 2007. An empirical analysis of the levers of control framework. *Accounting, Organizations and Society*, 32(7-8), pp. 757–788.

Wijethilake, C., & Ekanayake, A. (2018). Proactive Strategic Responses to Corporate Sustainability Pressures: A Sustainability Control System Framework. *Advances in Management Accounting,* 129-173. doi:10.1108/s1474-787120180000030006

Wilden, R., &Gudergan, S. P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence. *Journal of the Academy of Marketing Science*, 43(2), 181-199.

Willem, A. and Buelens, M. (2009), “Knowledge sharing in inter-unit cooperative episodes: the impact of organizational structure dimensions”, *International Journal of Information Management*, Vol. 29 No. 2, pp. 151-160.

Williams, T. (2014). *Organizational change for corporate sustainability*. Routledge.

Winter, S. G. (2003), 'Understanding dynamic capabilities', *Strategic Management Journal*, vol. 24 no. 10, pp. 991-995.

Withey, M., Daft, R. L., & Cooper, W. H. (1983). Measures of Perrow's Work Unit Technology: An Empirical Assessment and a New Scale. Academy of Management Journal, 26(1), 45-63.

Womack JP, Jones DT, Roos D. 1991. The Machine that Changed the *World: The Story of Lean Production*. HarperCollins: New York.

Woodward J. (1965). *Industrial Organizations: Theory and Practice*, Oxford University Press.

Woodward, J. (1965). *Industrial organization: theory and practice*. London: Oxford University Press.

Workman Jr, J. P. (1993). Marketing's limited role in new product development in one computer systems firm. *Journal of Marketing Research*, 405-421.

Wright, P. M., and Snell, S. A. (2009), 'Human resources, organizational resources, and capabilities' in Storey, J. (ed.), *The Routledge companion to strategic human resource management*, Routledge, London, pp. 345-356.

Wu, J., Zhuo, S., & Wu, Z. (2017). National innovation system, social entrepreneurship, and rural economic growth in China. *Technological Forecasting and Social Change*, 121, 238-250.

Xie, X., Fang, L., Zeng, S., & Huo, J. (2016). How does knowledge inertia affect firms product innovation? *Journal of Business Research*, 69(5), 1615–1620.

Xu, Shang, Yu and Liu, 2019. Intellectual Capital, Technological Innovation and Firm Performance: Evidence from China’s Manufacturing Sector. *Sustainability*, 11(19), p.5328.

Yadav S, Shinde A, Junavane P, Mate T (2018). Smart IV fluid and oxygen control system. *International Research journal of Engineering and technology (IRJET)*.05(02):314:314-7.

Yafi, E., Tehseen, S., & Haider, S. A. (2021). Impact of Green Training on Environmental Performance through Mediating Role of Competencies and Motivation. *Sustainability, 13*(10), 5624. doi:10.3390/su13105624

Yager, T. R. (2017). *The Mineral Industry of Botswana. Minerals Yearbook: Area Reports: International Review 2013 Africa and the Middle East*, 3, 1. Routledg pb.

Yahaya, O. A., & Lamidi, Y. (2015). Empirical examination of the financial performance of Islamic banking in Nigeria: A case study approach. *International Journal of Accounting Research*, 42(2437), 1-13.

Yalcinkaya, G., Calantone, R. J., & Griffith, D. A. (2007). An examination of exploration and exploitation capabilities: Implications for product innovation and market performance. *Journal of International Marketing*, 15(4), 63-93.

Yan, Y., Chong, C. Y., & Mak, S. (2010). An exploration of managerial discretion and its impact on firm performance: Task autonomy, contractual control, and compensation. *International Business Review*, 19(6), 521-530.

Yarahmadi, H., Karami, A. & Siwan, M. (2015). *Strategic marketing management and firm performance*. Lambert Academic publishing.

Yeo, V. C. S., Goh, S. K., & Rezaei, S. (2017). Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services. *Journal of Retailing and Consumer Services*, 35, 150-162.

Younis, H., Sundarakani, B., & Vel, P. (2016). *The impact of implementing green supply chain management practices on corporate performance*. Competitiveness Review.

Yousefi, A., 2015, 'A Panel Granger causality test of investment in ICT capital and economic growth: Evidence from developed and developing countries', *Economics World* 3(5-6), 109-127. https://doi.org/10.17265/2328-7144/2015.0506.001.

Yousefi, A., 2015, 'A Panel Granger causality test of investment in ICT capital and economic growth: Evidence from developed and developing countries', *Economics World* 3(5-6), 109-127. https://doi.org/10.17265/2328-7144/2015.0506.001.

Yun, J. H. J., Park, S., & Avvari, M. V. (2011). Development and social diffusion of technological innovation: cases based on mobile telecommunications in national emergency management. *Science, Technology and Society*, 16(2), 215-234.

Yunis, M., Tarhini, A., & Kassar, A. (2018). The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship. *Journal of Business Research*, 88(June 2017), 344–356. doi:10.1016/j. jbusres.2017.12.030.

Zahra, S.A., Sapienza, H.J. and Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: a review, modeland research agenda. *Journal of Management Studies*,43,pp. 917–955.

Zander U, Kogut B. 1995. Knowledge and the speed of the transfer and imitation of organizational capabilities. *Organization Science* 6(1): 76–92.

Zhang, Y. J., Peng, Y. L., Ma, C. Q., & Shen, B. (2017). Can environmental innovation facilitate carbon emissions reduction? Evidence from China. *Energy Policy*, 100, 18-28.

Zhang, Y., Khan, U., Lee, S., & Salik, M. (2019). The influence of management innovation and technological innovation on organization performance. A mediating role of sustainability. *Sustainability*, 11(2), 495.

Zhang, Z., Dong, Y., Li, F., Zhang, Z., Wang, H., Huang, X., ... & Diao, X. (2016). The Shandong Shidao Bay 200 MWe high-temperature gas-cooled reactor pebble-bed module (HTR-PM) demonstration power plant: an engineering and technological innovation. *Engineering*, 2(1), 112-118.

Zhang, Z., Lee, J. C.-K., & Wong, P. H. (2016). Multilevel structural equation modeling analysis of the servant leadership construct and its relation to job satisfaction. *Leadership & Organization Development Journal*, 37(8), 1147–1167. doi:10.1108/LODJ-07-2015-0159

Zhou, K. Z., & Li, C. B. (2007). How does strategic orientation matter in Chinese firms? *Asia Pacific Journal of Management*, 24(4), 447-466.

Zhou, K. Z., Yim, C. K., & Tse, D. K. (2005). The effects of strategic orientations on technology-and market-based breakthrough innovations. *Journal of Marketing*, 69(2), 42-60.

Zikmund, W. G., Carr, J. C., & Griffin, M. (2013). *Business Research Method*s (Book Only). Cengage Learning.

Zollo M, Singh H. 1998. The impact of knowledge codification, experience trajectories and integration strategies on the performance of corporate acquisitions. *Academy of Management Best Paper Proceedings*, San Diego, CA.

Zollo M, Winter S. 1999. From organizational routines to dynamic capabilities. *INSEAD R&D working papers*, *University of Pennsylvania*, 99/48/SM.

Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, 13(3), 339-351.

APPENDIX

APPENDIX A: Abbreviation

EAC	Eastern African Community
HRM	Human Resource Management
CEO	Chief Executive Officer
CFO	Chief Finance Officer
MVA	Market Value of Asset
GDP	Gross Domestic Product
GMCs	Gold Mining Companies
AVE	Average Variance Extracted
CR	Composite Reliability
S.D.	Standard Deviation
SKEW	Skewness
KUR	Kurtosis
df	Degree of Freedom
P-value	statistical significance Level
B	Standard Solution
SE	Standard Error
t	t-test
F	F-test
CMIN/df	Chi-square (χ^2) and its associated *p*-value, the ratio of χ^2 statistics to the degree of freedom (df)
CFI	Comparative Fit Index
NFI	Incremental Fit Index
IFI	Incremental Fit Index
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation

OE	Organizational Environment
EnS	Environmental Safety
EnD	Environmental Dynamism
EnC	Environmental Comfort
SF	Social Factor
OP	Operator Proficiency
TN	Training Need
SA	Social Attitudes
TI	Technological Innovation
TPr	Technology Productivity
Tre	Technology Reliability
TEf	Technology Efficiency
CS	Control System
CIS	Control and Information system
OC	Operating Compliance
Cap	Capabilities
FP	Firm Performance
Prof	Profitability
Gro	Growth
MA	Market Value

Appendix B: Questionnaire

Questionnaire

Subject Structural equation model of gold mining companies' performance in eastern African community (EAC)

Researcher Mr Navidreza Ahadi

Course Degree of Doctor of Philosophy in Industrial Business Administration **King Mongkut's Institute of Technology Ladkrabang, Bangkok**

Explanation

1. **Questionnaire Objective**

   This research aims to study the structural equation model of gold mining companies' performance in eastern African community (EAC)

2. **Questionnaire consist of 2 parts**

   Part 1: Background & General Information

- Where is your mining company located?
- Position in Company
- Respondent's experience in mining projects?
- Please mention your level of education
- what is the number of employees at your organization or something?

- What type of Mining projects does your company specialize in?

  Part 2: Questionnaire

- Please rate your opinion on a 7-point Likert scale

3. Questionnaire is designed to follow the research framework for the doctorate degree. Answers to the questionnaire are strictly confidential. Conclusion derived through statistical processing of the results is the overall average of all the respondents, and will not affect the status of the staff nor the departments

Section 1: Background & General Information

Please and tick the right options and answer the questions.

1. Where is your mining company located?

2. Position in Company:

- Vice president,
- sales manager,
- chief executive officer,
- Chief finance officer,
- Operational executives,
- Chief Human resource officer,

3. Respondent's experience **in** mining projects? (Years) (Months)

4. Please mention your level of education:

- Bachelor
- Master
- PhD
- Others

5. what is the number of employees at your organization or something?

- < 100 staff
- 101to 250 staff
- 251to 500 staff
- > 500 staff

6. What type of Mining projects does your company specialize in?

………………………………………………………………………………………

Section II: Questionnaire

7. Please rate your opinion on a 7-point Likert scale on the following criteria in terms of their importance from scale of 1 strongly disagree to scale of 7 strongly agree.

Criteria	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	1	2	3	4	5	6	7
Organization Environment							
Environmental Comfort							
1. My employer's work environment must be positive in a direction so that they can add more creativity at work.							
2. Overall, I find my work environment comfortable for the personnel due to using the advanced technology.							
3. My organization has a safe work environment due to applying innovative means.							
4. I believe that my organization needs an Intensity of environmental changes to upgrade our technical control process.							
Environmental Dynamism							

5. My company business unit consistently change its practices to keep up with cutting edge innovations							
6. In my company, the machinery accuracy degree is high.							
7. My company follows the local technological dynamism rather than international technological standards.							
8. My company follows to setup a dynamic environment through innovation and technologies							
Environmental Safety							
9. Safety management at my Company is a priority.							
10. Having an Environmental Management System is necessary for my mining company.							
11. My logistics safety is compliant with internationally recognized systems such as ISO 14001 or EMAS.							
12. My company has an environmental action plan outlining key actions and targets for the current year.							
Social Factor							
Operator proficiency							
13.Having Line proficiency checks (LPCs) which are carried out by Line Training Captains (suitably qualified commanders) can help the company significantly.							
14. I believe that an Operator Proficiency Check must be conducted by a Type Rating Examiner (TRE) to respect the technological standards.							
15. Each mining operator must undergo an "operator proficiency check" every once a while to demonstrate his or her competence in carrying out normal, abnormal and emergency procedures.							
Training needs							
16. In my company, we consider aligning resources to meet the technological business advances and control process of the Company.							

17. In my company, it matters the most to understand the costs, profits, markets, and added value of the department and how those contribute to the success of Company.							
18. In my company, it's important to look at the "big picture" of Company's goals, rather than the individual department's needs.							
19. In my opinion, it matters to anticipate global trends in the light of endorsing company's norms and values							
Social Attitudes							
20. My colleagues are effective in encouraging the management team toward applying technical advanced software.							
21. My colleagues are helpful when I need them to figure out the situation regarding an innovative issue in the company.							
22. I try to be interested in what my colleagues share with me as a solution, strategy, or technological approach							
23. I believe the employees are being supportive in solving technical issues in the control system process.							
Technological Innovation							
Technology Productivity							
24. My company is more efficient than the majority of its competitors.							
25. My company is using more innovative technologies than the majority of its competitors.							
26. My company uses information technology to improve the productivity of labor through automation.							
Technology Reliability							
27. The innovative software technology is reliable for my mining company to develop and expand rapidly.							
28.Technological software is reliable enough to succeed the system							
29. For my company, the innovative devices are reliable that the staff can trust on with confident.							

30. Technologically, the devices we utilize do function as they are manufactured with latest innovation.							
Technology Efficiency							
31. My company uses information technology to improve the levels of production through control process.							
32. Information technology assists my company in serving new market segments.							
33. Information technology increases my company's ability to anticipate customer needs.							
Control System							
Control and Information System							
34. Mission of the organization is tied with the Information System and it is to the attention of managers and employees.							
35. I pay attention to the main factors that are believed as essential to the success of organization in the future.							
36. I know the goals that are believed as the future success of the firm since they are widely distributed and presented to managers and employees.							
37. I know the activities and processes required to ensure the success of the strategic plan adopted by the organization.							
Operating Compliance							
38. My company's control system adopts the organization processes and activities that it deemed necessary to ensure its success.							
39. I received in formal character the strategic plan implemented in the organization through direct communication by the senior management of the company.							
40. I know the mission and vision stated in the strategic plan of the institution since they are widely disseminated and presented to managers and employees.							
Capabilities							

41. I believe that the existing structure allows adopting the system of performance evaluation that affects or is affected by Strategic Planning.							
42. My company adopts key performance indicators related to the goals and success factors of the strategic plan.							
43. My organization uses processes to evaluate individual, group and organizational performance.							
44. My company's level of performance is required to achieve each of the areas defined in setting the goals.							
Firm performance							
Profitability							
45. In my company, Improvement in Return on Sales (ROS) from our business is assured.							
46. In my company, Improvement in Return on Investment (ROI) from our business is assured.							
47. In my company, Improvement in Return on Assets (ROA) from the business is met according to the estimation.							
Growth							
48.My company interested in long-term growth, but have occasional concerns about fluctuation							
49. My company's growth in turnover/sales from the business over the past five years is significantly positive.							
50. In my company, Growth on net profit earnings from the business over the past five years was satisfactory.							
Market Value							
51. Increase in market value of my company has been met during the last fiscal year.							
52.Construction of modern camps and machines have been implemented during the last fiscal year in my company							
53. My company needs to have a faster growing market.							

Thank you for your participation

APPENDIX C: List of Symbols

$\overline{X}$	(Mean)
r	(Pearson's Product Moment Correlation Coefficient)
χ^2	(Chi - square)
λ	(Factor Loading)
**	Statistical Significance Level 0.01 ($P<0.01$)
*	Statistical Significance Level 0.05 ($P<0.05$)
***	Statistical Significance level at 0.001 ($P< 0.001$)
β	Beta
Δ	Change
$\chi 2$	Chi-square
μ	Mean value
$\chi 2/df$	Relative Chi-square
$\sqrt{}$	Square Root
σ	Standard deviation
Σ	Summation

APPENDIX D: Regression Weights and Model Fit Summary

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
SF	<---	OE	0.793	0.038	20.659	***	
TI	<---	OE	0.466	0.053	8.879	***	
TI	<---	SF	0.495	0.059	8.329	***	
CS	<---	OE	0.087	0.049	1.772	0.076	
CS	<---	SF	0.367	0.05	7.296	***	
CS	<---	TI	0.55	0.062	8.935	***	
FP	<---	TI	1.032	0.075	13.779	***	
FP	<---	CS	0.012	0.068	0.169	0.866	
EnS	<---	OE	1				
EnD	<---	OE	0.987	0.031	31.819	***	
EnC	<---	OE	0.935	0.031	30.274	***	
CIS	<---	CS	1				
OC	<---	CS	1.069	0.047	22.666	***	
Cap	<---	CS	1.021	0.04	25.439	***	
SA	<---	CS	1				
TN	<---	CS	1.125	0.034	33.076	***	
OP	<---	CS	1.088	0.038	28.806	***	
TEf	<---	TI	1				
TRe	<---	TI	1.014	0.031	33.176	***	
TPr	<---	TI	1.071	0.038	28.363	***	
Ma	<---	FP	1				
Gro	<---	FP	0.976	0.029	33.693	***	
Prof	<---	FP	0.991	0.032	30.668	***	

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
Social_Factor	<---	Organizational_Environment	0.84
Technological_Innovation	<---	Organizational_Environment	0.472
Technological_Innovation	<---	Social_Factor	0.473
Control_System	<---	Organizational_Environment	0.086
Control_System	<---	Social_Factor	0.343
Control_System	<---	Technological_Innovation	0.539
Firm_Performance	<---	Technological_Innovation	0.924
Firm_Performance	<---	Control_System	0.011
EnS	<---	Organizational_Environment	0.908
EnD	<---	Organizational_Environment	0.932
EnC	<---	Organizational_Environment	0.914
CIS	<---	Control_System	0.96
OC	<---	Control_System	0.887
Cap	<---	Control_System	0.962
SA	<---	Social_Factor	0.891
TN	<---	Social_Factor	0.96
OP	<---	Social_Factor	0.907
TEf	<---	Technological_Innovation	0.887
TRe	<---	Technological_Innovation	0.887
TPr	<---	Technological_Innovation	0.876
Ma	<---	Firm_Performance	0.902
Gro	<---	Firm_Performance	0.939
Prof	<---	Firm_Performance	0.908

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
e10	<-->	e15	0.068	0.014	4.984	***	
e7	<-->	d2	-0.112	0.018	-6.357	***	
e7	<-->	d3	-0.061	0.013	-4.729	***	
e12	<-->	d1	0.069	0.012	5.702	***	
e1	<-->	d3	0.047	0.01	4.605	***	
e7	<-->	e6	0.05	0.011	4.4	***	
e8	<-->	e10	0.062	0.013	4.859	***	
e10	<-->	d4	0.075	0.014	5.247	***	
e11	<-->	d3	0.052	0.009	5.929	***	
e6	<-->	e11	0.039	0.009	4.249	***	
e8	<-->	e15	0.053	0.012	4.253	***	
e4	<-->	d3	0.039	0.01	3.797	***	
e2	<-->	e9	0.024	0.008	3.051	0.002	
e8	<-->	d3	0.036	0.01	3.605	***	
e5	<-->	e15	0.029	0.008	3.413	***	
e12	<-->	e14	-0.027	0.008	-3.243	0.001	
e13	<-->	d1	0.039	0.012	3.209	0.001	

Correlations: (Group number 1 - Default model)

			Estimate
e10	<-->	e15	0.292
e7	<-->	d2	-0.572
e7	<-->	d3	-0.272
e12	<-->	d1	0.409
e1	<-->	d3	0.307
e7	<-->	e6	0.195
e8	<-->	e10	0.265
e10	<-->	d4	0.415
e11	<-->	d3	0.424
e6	<-->	e11	0.276
e8	<-->	e15	0.26
e4	<-->	d3	0.25
e2	<-->	e9	0.271
e8	<-->	d3	0.216
e5	<-->	e15	0.232
e12	<-->	e14	-0.206
e13	<-->	d1	0.205

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Organization_Environment	0.785	0.066	11.923	***	
d1	0.206	0.021	9.827	***	
d3	0.138	0.016	8.652	***	
d2	0.107	0.015	7.006	***	
d4	0.123	0.016	7.534	***	
e1	0.168	0.016	10.639	***	
e2	0.115	0.013	9.051	***	
e3	0.134	0.013	10.291	***	
e7	0.359	0.03	12.007	***	
e8	0.204	0.019	10.883	***	
e9	0.068	0.011	5.997	***	
e6	0.181	0.015	11.965	***	
e5	0.076	0.011	7.024	***	
e4	0.178	0.016	11.343	***	
e12	0.139	0.013	11.018	***	
e11	0.108	0.012	8.694	***	
e10	0.268	0.021	13.062	***	
e13	0.179	0.016	11.001	***	
e14	0.123	0.013	9.658	***	
e15	0.2	0.017	11.547	***	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Organization_Environment	0.785	0.066	11.923	***	
d1	0.206	0.021	9.827	***	
d3	0.138	0.016	8.652	***	
d2	0.107	0.015	7.006	***	
d4	0.123	0.016	7.534	***	
e1	0.168	0.016	10.639	***	
e2	0.115	0.013	9.051	***	
e3	0.134	0.013	10.291	***	
e7	0.359	0.03	12.007	***	
e8	0.204	0.019	10.883	***	
e9	0.068	0.011	5.997	***	
e6	0.181	0.015	11.965	***	
e5	0.076	0.011	7.024	***	
e4	0.178	0.016	11.343	***	
e12	0.139	0.013	11.018	***	
e11	0.108	0.012	8.694	***	
e10	0.268	0.021	13.062	***	
e13	0.179	0.016	11.001	***	
e14	0.123	0.013	9.658	***	
e15	0.2	0.017	11.547	***	

Squared Multiple Correlations: (Group number 1 – Default model)

	Estimate
Social_Factor	0.705
Technological_Innovation	0.82
Control_System	0.866
Firm_Performance	0.872
Prof	0.825
Gro	0.881
Ma	0.848
TPr	0.767
TRe	0.892
TEf	0.858
OP	0.823
TN	0.921
SA	0.794
Cap	0.925
OC	0.824
CIS	0.587
EnC	0.836
EnD	0.869
EnS	0.824

Modification Indices (Group number 1 - Default model)

Covariances: (Group number 1 - Default model)

			M.I.	Par Change
e14	<-->	e15	5.955	-0.021
e13	<-->	d4	5.245	0.02
e13	<-->	e14	4.885	0.02
e11	<-->	e10	4.5	0.018
e4	<-->	e13	6.26	-0.025
e7	<-->	d1	5.608	0.025
e7	<-->	e10	5.947	-0.023
e2	<-->	e12	6.131	0.019
e1	<-->	e5	4.442	-0.017
e1	<-->	e6	7.341	0.025

Variances: (Group number 1 - Default model)

	M.I.	Par Change

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
Prof	<---	EnS	4.213	0.046
SA	<---	EnS	4.076	0.044
EnS	<---	OC	4.075	0.04

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	55	126.866	65	0	1.952
Saturated model	120	0	0		
Independence model	15	8674.469	105	0	82.614

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	0.016	0.961	0.928	0.521
Saturated model	0	1		
Independence model	0.708	0.111	-0.016	0.097

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.985	0.976	0.993	0.988	0.993
Saturated model	1		1		1
Independence model	0	0	0	0	0

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	0.619	0.61	0.615
Saturated model	0	0	0
Independence model	1	0	0

NCP

Model	NCP	LO 90	HI 90
Default model	61.866	33.738	97.789
Saturated model	0	0	0
Independence model	8569.469	8267.165	8878.075

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	0.304	0.148	0.081	0.235
Saturated model	0	0	0	0
Independence model	20.802	20.55	19.825	21.29

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.048	0.035	0.06	0.6
Independence model	0.442	0.435	0.45	0

APPENDIX E: Reliability of Measurement

Cronbach's Alpha for Firm Performance observe variables

Firm Performance			
Observe Variables	Factors (questions)	Discriminant	Cronbach's Alpha
Market Value	MarketVa1	0.747	0.916
	MarketVa2	0.758	
	MarketVa3	0.828	
Growth	Growt1	0.770	0.903
	Growt2	0.752	
	Growt3	0.817	
Profitability	Prof1	0.790	0.938
	Prof2	0.821	
	Prof3	0.809	

Cronbach's Alpha for Technological Innovation's observe variables

Observe Variables	Factors (questions)	Discriminant	Cronbach's Alpha
Technology Productivity	TechPro1	0.814	0.915
	TechPro2	0.789	
	TechPro3	0.822	
Technology Reliability	Techrelib 1	0.802	0.904
	Techrelib 2	0.762	
	Techrelib 3	0.812	
	Techrelib 4	0.801	
Technology Efficiency	Techeffic1	0.822	0.913
	Techeffic2	0.842	
	Techeffic3	0.816	

Cronbach's Alpha for Social Factor observe variables

Observe Variables	Factors (questions)	Discriminant	Cronbach's Alpha
Operator Proficiency	Operprof1	0.771	0.894
	Operprof2	0.781	
	Operprof3	0.770	
Training Need	Traine1	0.806	0.920
	Traine2	0.814	
	Traine3	0.782	
	Traine4	0.751	
Social Attitude	Socialatt1	0.754	0.889
	Socialatt2	0.770	
	Socialatt3	0.751	
	Socialatt4	0.770	

Cronbach's Alpha for Control System observe variables

Observe Variables	Factors (questions)	Discriminant	Cronbach's Alpha
Control and Information System	CISyst1	0.744	0.923
	CISyst2	0.748	
	CISyst3	0.783	
	CISyst4	0.793	
Operating Compliance	Opcom1	0.798	0.935
	Opcom2	0.827	
	Opcom3	0.818	
Capabilities	Capa1	0.774	0.904
	Capa2	0.797	
	Capa3	0.821	
	Capa4	0.787	

Cronbach's Alpha for Organization Environment observe variables

Observe Variables	Factors (questions)	Discriminant	Cronbach's Alpha
EnS	envisafety1	0.777	0.919
	envisafety2	0.787	
	envisafety3	0.833	
	envisafety4	0.826	
EnD	envidynamism1	0.754	0.880
	envidynamism2	0.785	
	envidynamism3	0.724	
	envidynamism4	0.743	
EnC	envicomfort1	0.796	0.885
	envicomfort2	0.729	
	envicomfort3	0.731	
	envicomfort4	0.770	

Reliability Statistics	
Cronbach's Alpha	N of Items
0.989	53

AUTHOR BIOGRAPHY

Name:	Mr. Navidreza Ahadi
Date of Birth	May 29, 1988
Address	204, 2nd floor, Heritage Suvarnabhumi, soi 46/3, Ladkrabang road, Ladkrabang 10520, Bangkok Thailand

Education

Master of Business Administration, Major in Finance and Banking 2015

Institute of International Studies, Ramkhamhaeng University

Bachelor of Business Administration, Major in Marketing 2011

Bangkok University International

Diploma Degree in Gemology 2007

Asian Institute of Gemological Science (AIGS)

Work Experience

Full-time Lecturer May 2019-Present

King Mongkut's Institute of Technology Ladkrabang Business School

Researcher, Part-time lecturer August 2015 - Present

KMITL Business School, College of Educational Innovation Research

King Mongkut's Institute of Technology Ladkrabang

Business Development Manager December. 2012 - November. 2015

True Clarity International