KNOWLEDGE MANAGEMENT, ORGANISATIONAL LEARNING, ORGANISATIONAL CHARACTERISTICS AND PERFORMANCE OF COMPANIES LISTED AT THE NAIROBI SECURITIES EXCHANGE

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A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

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DECLARATION

This research thesis is my original work and has not previously been presented in part or in entirety to any University for award of any degree.

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DEDICATION

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ABBREVIATIONS AND ACRONYMS

AVE	:	Average Variance Extracted
BSC	:	Balanced Scorecard
CB- SEM:		Covariance based structural equation modeling
CMA	:	Capital Markets Authority
DCT	:	Dynamic Capabilities Theory
f^2	:	R^2 change
GDP	:	Gross Domestic Product
HC	:	Human Capital
HTMT	:	Heterotrait-monotriat Ratio
$HTMT_{inference}$		Heterotrait-monotriat Inference
IC	:	Intellectual Capital
ICT	:	Information Communication Technology
IFC	:	International Finance
IFC	:	International Finance Corporation
IT	:	Information Technology
KBV	:	Knowledge Based View
KM	:	Knowledge Management
KMS	:	Knowledge Management Systems
KPMG	:	Klynveld Peat Marwick Goerdeler (accounting firm)
LA	:	Latent Variable
NSE	:	Nairobi Securities Exchange
OC	:	Organisation Characteristics
OECD	:	Oganisation for Economic Co-operation and Development
OL	:	Organisational learning
OP	:	Orgnisational Performance
Q^2	:	Cross validated redundancy
q^2	:	Q^2 change
R^2	:	Coefficient of determination
PLS-SEM:		Partial Least Squares Structural Equation Modeling
RBV	:	Resource Based View

ROA	:	Return on Assets
SEM	:	Structural Equation Modelling
SSE	:	Sum of Squared Predictive Errors
SSO	:	Sum of Squared Observations
USA	:	United States of America
VAF	:	Variance Accounted For
VIF	:	Variance Inflation Factor
VRIN	:	Valuable, Rare, Inimitable and Non-substitutable
VRIO	:	Valuable, Rare, Inimitable and Organisation

ABSTRACT

This study conceptualizes relationships among knowledge management (KM), organisational learning (OL), organisational characteristics (OC) and organisational performance OP. Scholars agree that KM is linked with sustained organisational performance. However this linkage remains unclear. Yet scholars acknowledge that knowledge management is a crucial necessity in all organisational operations. The study set out to gain deeper understanding on how organisational learning and organisational characteristics affect the relationship amongst knowledge management and organisational performance. The study's specific objectives were; to examine the relationship between knowledge management, and organisational performance, establish the mediation role of organisational learning on the relationship between knowledge management and organisational performance, establish the moderating role of organisational characteristics on knowledge management and organisational performance, and finally establish whether the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance is significantly greater than that of the individual effect of knowledge management on organisational performance in companies listed at the NSE. The objectives had corresponding hypotheses which were stated and tested using PLS-SEM. Through a cross-sectional survey, the researcher collected data from companies listed at the NSE using a structured questionnaire. The PLS-SEM analysis findings indicated a statistically significant direct relationship between knowledge management and organisational performance. Results indicated that organisational learning partially but strongly mediated the link between knowledge management and organisational performance. Organisational characteristics' moderation role on the relationship amongst knowledge management and organisational performance was found to be negative but statistically insignificant. Results indicated that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance was significantly greater than that of the individual effect of knowledge management on organisational performance. This is in agreement with the theory of complementarities. The findings also revealed that the connection between knowledge management and organisational performance is indirect as it is mediated by organisational learning. This implies that organisations should find the best way to use organisational variables as complements of each other for best results in terms of competitive advantage and therefore organisational performance.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Superior organisational performance is the ultimate objective of managers in any organisation. Competitive advantage is appreciated as an antecedent to superior organisational performance (Ray, Barney and Muhanna, 2004). In accordance to Resource Based View (RBV), competitive advantage can only be realized when organisations understand and gainfully employ their internal resources (Barney, 1991). These comprise all organisational capabilities, processes, organisational factors, information and knowledge that an organisation owns or controls. Knowledge is perceived as the main national and company resource (Bhatti, Khan, Ahmad, Hussain and Rehma, 2011). Zack (1999), posits that knowledge has become the fundamental basis of competition. However for knowledge to translate into strategic advantage it has to be managed.

Wiklund and Shepherd (2003), assert that RBV research has mainly focused on characteristics of organisational resources and hence have paid little attention to the relationships amongst these assets and the way organisations are structured. The bulk of the prior research papers concentrated on the impact of company specific resources on organisational performance, the current focuses the mediation effect of organisational learning and the moderation effect of organisational characteristics on the relationship between knowledge management and organisational performance. The current study suggested that organisational learning mediates the relationship between knowledge management and organisational performance, and also that organisational characteristics moderate the same relationship. The extant study also proposes that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is greater than that of the individual effect of knowledge management.

This study is underpinned by a number of theories which inform the study concepts. These theories comprise RBV, Knowledge Based View (KBV), Dynamic Capabilities theory, Organisational Learning theory and the Theory of Complementarities. In principle, the RBV contends that organisations posses assets which equip them to attain competitive advantage, and hence results into greater sustainable performance (Wernerfelt, 1984). Expanding the customary concept of organisational resource-based competence of the organisation's knowledge management (KM) purpose, an organisation's KM competence is described as the capability to marshal and employ knowledge based resources and combine them with other resources and competences. The knowledge management resources in addition consists of capabilities which are challenging to replicate (Johannessen and Olsen, 2003).

Tsang (1997), described organisational learning as organisational endeavor to transform into learning organisations by enhancing learning in a cognizant, methodological and synergistic manner that encompasses all organisational members. In addition, organisational learning has been described by scholars as a transformation of organisational knowledge which arises due to experience (Fiol and Lyles, 1985). The study is also anchored on Dynamic capability theory. Dynamic capability is the aptitude of an organisation to attain competitive advantage by using innovation to regenerate a firms resources and competences in alignment with the dynamic business environment (Teece, et al. 1997; Wheeler, 2002; Zollo and Winter, 2002).

Finally the study is underpinned by the theory of complementarities. The theory of complementarities argues that the influence of a structure of complementary activities gives higher results as compared to the individual results of its parts. This occurs as a result of the synergistic effects of combining practices together (Milgrom and Roberts, 1995). This study endevours to examine the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance.

The extant study was carried out in the 61 companies listed at the Nairobi Securities Exchange (NSE) as at December 2015. The NSE was chosen for this study because it

represents critical sectors of the Kenyan economy comprising of construction and allied, agriculture, energy and petroleum, vehicles and fittings, banking, industrial and allied, growth enterprise market segment, commercial and services, insurance, telecommunication and technology (Kenya National Bureau of Statistics, 2007). This being the case the companies listed on the NSE are likely to be leaders in innovation, the use of knowledge management being an example. In addition, performance records of each of the companies listed are readily available for public scrutiny.

Many companies listed in the NSE have been reporting poor performance in recent years. Africa Economic Outlook (2015), reported that the Kenyan economy registered poor performance in 2014. The Nation newspaper (2015, December, 3) reported that many companies listed on the NSE had made losses while others had given profit warnings. These included Car and General, Uchumi Supermarkets, Standard Group, Crown Paints, ARM Cement and East African Cables among others. While some companies were reported to have made losses, others reported profits. To perform well, organisations need to possess and control resources that enhance performance. Knowledge is an example of such resources and has been recognised as one of the crucial resources leading to competitive advantage and hence organisational performance.

Having noted the differences in performance of organisations listed on the NSE, the researcher was motivated to carry out this study in an effort to determine the mediation role of organisational learning on the relationship between knowledge management and performance, and the moderation role of organisational characteristics on the same relationship. The study also aimed at determining whether the complementary effect of knowledge management, organisational learning and organisational characteristics on performance significantly differs from the effect of knowledge management on its own.

1.1.1 Knowledge Management

According to Sherif, Hoffman and Thomas (2006), knowledge is gradually translating into the most significant element of production, as compared to labour, land and capital. Blanchard and Thacker (2009), defined knowledge as a systematic framework of realities,

ideologies, processes and information attained with time. On the other hand, Noe (2008), defined knowledge as what individuals or teams of employees know, organisational guidelines, procedures, tools, and routines. Davenport and Prusak (2000), hold that knowledge is a blend of practices, standards, firm specific information and skilled perception which provide a basis for evaluation and incorporation of fresh practices and information. O'Dell and Grayson (1998), posit that innovation of products, routines, services, associations, fresh markets and segments all lead to creation of knowledge.

The influence of knowledge in the modern social and organisational setting is immensely weighty (Foray, 2004; Foss, 2005). OECD (1996), posits that the contemporary economy is based on knowledge. In agreement with this, World Bank (2007) found that the knowledge economy is characterised by a well trained and learned population, institutions that encourage and reward knowledge creation and transfer in the economy aimed at growth, welfare, continued upgrading of information systems, and a relevant innovation system. Pemberton and Stonehouse (2000), hold that knowledge may be personified into an organisations knowledge assets that comprise of its essential proficiencies, value-enhancing undertakings, systems, technology, structures, products and services. Knowledge is a human, highly individual asset and embodies the collective know-how and labour of networks and alliances.

The advancement and practice of KM is incessantly and growing continuously in organisations. As a consequence of developments in KM, the contest in search of sustainable competitive advantage via knowledge continues to intensify at a rapid speed (Hofer-Alfeis, 2003). Knowledge management involves the management of the knowledge base of an organisation. Zeleny, Comet and Stoner (1990), posit that an organisation's knowledge base consists of brainware (human experience, skills and acquired knowledge) and hardware which are made up of procedures, technology and other physical objects that incorporate knowledge. In addition it includes groupware which comprises informal processes, rules of thumb, stories and unrecorded codes of behaviour. It also includes document ware which comprises of all organisational documents contained

in the information systems such as databanks, recorded reports, handbooks, patents and formally documented knowledge.

Knowledge management is a basis for using systems and procedures at personal, group, and organisational levels to facilitate organisations to learn from their existing knowledge and obtain fresh knowledge to generate value for stakeholders. A knowledge management framework integrates individuals, practices and equipment to enhance performance and learning for long term progress (Tantawy-Monsou, 2005). Gupta and Govindarajan (2000), define knowledge management as the practice that enable organisations to unearth, select, systematise, distribute, and transmit crucial information and competence that is essential for resolution of problems, dynamic learning, tactical planning and decision making.

1.1.2 Organisational Learning

Senge (1990), defined organisational learning as a constant analysis of experience and its conversion into knowledge accessible to all organisational members. This learning has to be relevant to the mission of the organisation. Applied learning is reinforced when persons or groups follow a sequence of involvement, observation and reflection, abstract conceptualisation, and active experimentation (Rowley, 2006). Dimovski (1994), identifies the perspectives to organisational learning as the processes of information acquirement, information construal and the resultant behavioural and cognitive modifications that will result into some influence on performance in an organisation.

Fuglesth, and Gronhaug (2003), in their review of literature found that organisational learning infers to learning beyond the personal level. There is increasing emphasise from management scholars, on the importance of intensified learning, especially through creation of new knowledge (Cohen and Bailey, 1997). They in addition stress that individual and group learning ought to be connected to organisational norms, rules and regulations (Wenger, 1998). This kind of connection is essential in order to understand how organisational wide learning could lead to intensive undertakings which increase organisational performance. For organisational learning to be successful, its organisational environment and external environment have to be favourable. The environmental context

comprises elements without the organisational borders such as competition, clientele, learning institutions, and governments (Glynn, Lant and Milliken, 1994).

1.1.3 Organisational Characteristics

Organisational characteristics can be regarded as the organisations' subsystems that are within the control of the organisation and have an effect on the achievement of organisational goals. They are distinguished from environmental elements external to the organisation that also influence the performance of organisations but are not in the control of the organisation (Morton, 1995). Keen (1993), describes organisational characteristics as organisational resources which include human, business and technology resources. For purposes of this study, structure, organisational culture, human capital and IT infrastructure have been used. These were chosen because they have been depicted as knowledge management enablers or knowledge management infrastructure, which is crucial for management of knowledge (Lee and Choi 2003, Gray and Durcikova 2005).

Organisational structure refers to the way in which responsibility, power and work procedures are distributed amongst organisation participants (Nahm, Vonderembse and Koufteros, 2003). According to Eriksen (2005), organisational structures have been categorised as either organic or mechanistic. According to Lunenburg (2012), mechanistic and organic firms are opposite ends of a range of firm structure types. Mechanistic firm's characteristics include efficiency, rigid chain of command, predictability, elevated levels of formality, strict adherence to guidelines and procedures, centralized decision making and vertical specialism. It has downward flow of communication and narrowly defined tasks.

Organic organisations are flexible, and adaptable. In particular, organic organisations have feeble or multiple hierarchies, weak formalisation, relaxed guidelines and policies, horizontal specialisation and devolved decision making where employee participation is encouraged. Communication flows downwards and upwards. Responsibility for tasks is flexible because they are adaptable to changing conditions. Organic structures can be defined as loose structures with little formalisation, in which multifaceted systems are in use and participatory decision making is the norm. On the other hand, mechanistic structures are extremely centralised and formal (Miller and Droge, 1986).

Organisational culture is defined as a configuration of uncomplicated assumptions, designed, learned, or advanced by a particular group in the process of learning to handle its difficulties in adapting to the external environment as well as internal integration. According to Denison (1990), the culture of an organisation forms the basis of its organisational management system, principles, practices and expected behavior. It influences the way in which decisions are made and also the way in which information and knowledge is shared and preserved (Stoyko, 2009). Cameron and Quin (2011), classified organisational culture into four categories: Clan culture is a team centered approach which emphasises a humane working environment, integration, flexibility, group commitment and loyalty. Hierarchy culture is bureaucratic and values stability and control where rules and procedures are used as control mechanisms. Market culture has an external orientation. It focuses on relationships or transactions with suppliers, customers, unions, legislators among others and its main concern is competitiveness. Adhocracy culture is future oriented and emphasises on entrepreneurial spirit, adaptability, innovation, creativity and flexibility.

Tayles, Pike and Sofian (2007), posit that Human Capital (HC) denotes knowledge, competences, experience and creativity of the workforce as well as their attitudes and motivation. Human capital specifically comprises the personal stock of knowledge entrenched in the organisations' combined competency to excerpt the best resolutions from the organisational members (Bontis, 2001). It is described as comprising of the employees' skillfulness, experience, abilities, and implicit knowledge (Edvinsson and Malone, 1997). Davenport and Prusak (1998), posit that human capital consist of the invisible assets made up of capabilities, work, and experience which employees bring to the organisation. Therefore human capital is understood as the joint worth of abilities, knowledge, expertise, experiences, and inspiration of employees (Aldisent, 2002).

An essential element of intellectual capital is human capital. It is considered as a crucial asset in many corporations working in software development, administration consultancies and financial services. Dess and Shaw (2001), found that the most crucial organisational asset in the next twenty years would be human capital, which is described as gifted, brilliant and seasoned people who have technological knowledge, are internationally astute and

operationally prompt in decision making and action. The connection amongst human capital and varied result elements is tracked to numerous past studies (Ducharme, 1998), organisational learning theory (Bontis et al. 2002), the RBV (Barney, 1991) and in the recent past KBV (Spender, 1996, Grant, 1996).

According to Kaplan and Norton (2004), human capital is understood to be intellectual capital that mirrors the creativity, knowledge, thinking, and decision making of human resources in organisations. Ulrich Lang (2001), posit that human capital is the core component in knowledge conception. The study found that, knowledge is generated and held conjointly by organisational members in closely interwoven teams. Human capital emanates from human resources in terms of skills and knowledge possessed by the employees. The quality of human capital in an organisation is due to employee selection, progression, and work (Koch and McGrath, 1996).

Malhotra (2003, 2005), hold that knowledge management is put up around human, process and technology. Technology on its own will not result into a sustainable competitive edge. This is because sooner than later technology is copied and therefore fails as a resource resulting into long-term competitive advantage. This led to the conclusion that human capital is the most crucial component towards effective knowledge management. This is because the processes necessary for effective knowledge management have to be developed by employees (Malhotra, 2003, 2005). Davenport and Prusak (2000), found that knowledge sharing is started at the human level, when this succeeds technology can be used to enhance the results.

Information Technology (IT) is used at a comprehensive level in order to heighten cooperation amongst organisational members. Information technology enables the acquisition, storage, processing, retrieving and transferring of knowledge (Reychav and Weisberg, 2010). According to Despres and Chuvel's (2000) model, Information Technology and Communication (ICT) include shared databases, email, groupware and video conferencing. Knowledge management systems (KMS) are information systems established for sustaining and boosting the firm practices of knowledge formation, storing, sharing and use (Alavi and Leidner, 2001).

Previous conceptual work in information technology imply that IT has capacity to boost long-lasting competitive advantage for a company (Porter, 1985). Nonetheless, emergent empirical evidence indicate that technology does not inevitably lead to a competitive edge and IT does not necessarily lead to organisational performance (Hitt and Brynjolfsson, 1996). In the current study IT is considered as one of the organisational characteristics that may moderate the association amongst knowledge management and organisational performance

1.1.4 Organisational Performance

Balta (2008), found organisational performance to be an intricate and multifaceted phenomenon. In agreement with this Richard, Devinney, Yip, and Johnstone (2009), posit that organisational performance comprises three precise parts of organisational results; financial results consisting of return on investments, profits and return on assets; market outcomes in terms of market share and sales; and investor yield in terms of aggregate investor profit and economic value addition. Eisenhardt and Santos (2002), found that most researchers in knowledge management did not study performance, while others merely stated that some knowledge management practices would enhance an organisations competitive advantage and performance. This indicates that more research needs to be done on organisational performance because it is an important indicator of the wellbeing of organisations and in turn an indicator of the wellbeing of an economy.

From a customary standpoint, organisational performance is usually represented as financial performance, however consideration of finances, resources, operations, services, markets and human resources are vital in determining of the overall performance of an organisation (Dixon, 1999). In an effort to measure performance, choices of tools such as the Balanced Score Card (BSC) and Intellectual Capital (IC) concepts have developed. These concepts measure both financial and non-financial performance. To measure financial and non-financial aspects of organisational performance, the researcher adopted the use of the BSC proposed by Norton and Kaplan (1996). In the BSC, performance is measured by including financial performance and measures that are not financial which comprise customer perspective, internal business process and organisation learning and growth.

1.1.5 Companies Listed at the Nairobi Securities Exchange

According to Olweny and Kimani (2011), the Nairobi stock exchange spurs fiscal growth in Kenya. The empirical findings from the Granger causality test, done in the aforementioned study supported the conclusion of the existence of a causal connection between performance of securities and economic growth. Hence, current stock values are expected to mirror the anticipated future dividends. This being the case the NSE 20-share index could therefore be a basis for forecasting impending economic activity. An upsurge in the NSE 20-share index is a potential indicator of the market's anticipation of greater dividends, corporate profits and consequently and greater economic growth. Results of companies listed on the NSE are expected to be an indication of the general economic performance in Kenya. This is because the companies listed are representative of the main sectors of the Kenyan economy.

The NSE started operations in the early 1920s as an informal market place for local shares and stocks. In 1954 it was recognized by the London Stock Exchange as an overseas stock exchange (Kibuthu, 2005). In 1994 the NSE broke a record in performance with a yield of 179%. Consequently the NSE was ranked as the world's best performing market by the International Finance Corporation (IFC). In 2006, the NSE applied an automated trading system which facilitated live trading. Trading hours were also increased. In 2014 the NSE sold its shares to the public. To date the NSE continues to grow and has become a major financial institution.

Data was collected in organisations that had been listed at the NSE by end of 2015. There were sixty one companies listed at the NSE by the end of 2015 (NSE Annual report, 2015). These companies were chosen because they operate in the major sectors of the economy which include agriculture, vehicles and fittings, finance, commercial and services, building and construction, energy sector, insurance, industrial and allied, telecommunication and technology, and growth enterprise market segment (CMA handbook, 2010). The study results are to a large extent expected to be generalizable across many types of organisations in developing countries.

1.2 Research Problem

The performance of organisations has generated a great deal of interest in business research. This interest is due to the fact that organisations exist to achieve specific objectives which constitute organisational performance. In order to achieve these objectives, organisations have to gain sustainable competitive advantage. The RBV holds that this can only be achieved when an organisation understands and gainfully employs resources under its control. One such critical resource is the knowledge held and controlled by organisations. This is because every incremental unit of knowledge employed successfully leads to a marginal growth in performance, unlike the traditional factors of production which are subject to diminishing returns (Gold et al., 2001). However knowledge needs to be managed. When organisations fail to manage knowledge, they are likely to lose valuable employee knowledge concerning suppliers, customers, partners or competitors that may not have been shared (Gorelick and Tantawy-Monsou, 2005). This could lead to poor performance.

Tantawy-Monsou (2005), suggested that knowledge management leads to organisational learning which in turn results into value creation for the market. Present day organisations are faced by dynamic economic uncertainty and volatility. Organisational learning (OL) is understood as one of the vital strategies for realisation of sustainable organisational performance, ensuring that organisations not only survive but also remain competitive (Cunningham and Gerrard, 2000). Organisational characteristics are organisations' subsystems which are controlled by the organisation. These subsystems have impact on the achievement of organisational goals (Morton, 1995). Organisational characteristics are understood to be knowledge management enablers and include technology, organisational culture, and organisational structure among others (Gold et al., 2001). In an endeavour to gain understanding on how knowledge management relates to organisational performance, the extant study aimed at determining the mediation influence of organisational learning and also the moderation role of organisational characteristics on the relationship between knowledge management and organisational performance.

Choi et al. (2008), studied the effects of knowledge management strategy on organisational performance. Results indicated a positive relationship between knowledge management and organisational performance. The study was however conducted only among large and profitable organisations in Korea, making it prone to bias that could have enabled knowledge management strategies to perform above the norm. The validity of the results may not be generalizable to organisations globally because the study was limited to large profitable Korean organisations, a developed economy setting.

Prior research by Liao and Wu (2009), revealed that organisational learning fully mediated the relationship between knowledge management and organisational performance. This study could have been prone to extreme bias since it was conducted in knowledge intensive organisations listed in the Common wealth Magazine's top 1000 manufacturers and top 100 financial organisations. This made the results less generalizable across organisations. Another study by Luxmi (2014), reported a difference in the magnitude of mediation of organisational learning on the relationship between knowledge management and organisational performance. The study found partial mediation while the previous one reported full mediation. From the aforementioned discussions on organisational learning, the extant study found a contextual gap because the previous studies had been conducted in knowledge intensive firms and developed countries. The study also intended to fill a conceptual gap due to the differing results on the magnitude of mediation from Liao and Wu (2009) and Luxmi (2014). Therefore the extant study set out to empirically determine whether organisational learning mediates the relationship between knowledge management and organisational performance in companies listed at the NSE, a context of a developing economy.

A review of literature did not reveal that an empirical study had been done on the moderating effect of the combination of organisational characteristics (structure, culture, human capital and IT infrastructure) on the relationship between knowledge management and organisational performance. Having noted that organisational characteristics are taken to be knowledge management enablers, the current study set out to establish whether

organisational characteristics had a moderating role on the relationship between knowledge management and organisational performance of companies listed at the NSE.

Barney (1991), argued that organisational resources comprise all assets, competences, organisational procedures and characteristics, information and knowledge possessed by the organisation. Black and Lynch (2001), concluded that there was synergy among organisational activities. They found that the way in which organisation employed the workplace activities jointly with other complementary activities was the most important factor determining organisational results. This is in line with the theory of complementarities. In support of this Milgram and Roberts, (1995) posit that the impact of complementary practices was higher as compared to the impact of its individual parts. This effect was due to the synergy resulting from bundling of practices together.

The extant study aimed at shedding some light on the effect of the complementary relationships amongst knowledge management, organisational learning, organisational characteristics and performance. The extant study found no evidence that an empirical study concerning the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance had been conducted previously. Therefore the study set out to fill this conceptual gap and empirical gap by investigating whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance was significantly greater than the individual effect of knowledge management on organisational performance of companies listed at the NSE.

The current study focused on the sixty one companies listed on the (NSE) by 31st December 2015. The NSE has an imperative role in the economic advancement of Kenya hence good performance in these companies is very crucial. Some organisations in Kenya and in the NSE continue to perform poorly with quite a number having posted losses and some even forced into receivership (NSE 2010). In 2014 the Kenyan economy registered very poor performance, the manufacturing sector grew by only 3.4%, while the agricultural sector grew by 3.5 % (Africa Economic Outlook 2015). However, many companies listed also reported good returns. Could the difference be due to knowledge management?

The extant study was aimed at establishing how knowledge management, organisational learning, and organisational characteristics impact on the performance of companies listed at the NSE in an attempt to shed some light to how they can be used to improve performance. The companies listed on the NSE represent the main sectors of the Kenyan economy namely; agriculture, vehicles and fittings, banking, commercial and services, building and allied, energy and petroleum, insurance, industrial, telecommunication and technology, and growth enterprise market segment. These provide a wide variation of organisational context which will enhance understanding of the aforementioned variables. Cabrita and Bontis (2008), suggested that an appropriate population should include companies within the same industry and across different industries, therefore these companies are an appropriate population of study. The results of a study on companies listed on the NSE will be more generalizable as compared to prior research papers which largely concentrated on a single organisation or industry. In addition companies listed at the NSE give a context of a developing country. Many previous studies were conducted in developed countries and very successful organisations.

Locally Adan (2013), did a case study to determine whether knowledge management enablers influence performance in Kenya Revenue Authority. He concluded that organisational structure, culture, people and IT infrastructure were all significant knowledge management enablers. Similarly Maseki (2012), did a case study on effects of organisational culture on success of knowledge management systems in which they used content analysis. The researcher found that knowledge management greatly affects performance of commercial banks. Both of these studies were case studies, therefore the results may not be robust enough to be generalized across other organisations.

After critique of literature, indications are that several studies have been carried out on knowledge management internationally. Zack, Mckeen, and Singh (2009), found gaps in the empirical evidence linking knowledge management and organisational performance. Overall there are mixed and conflicting results concerning the relationships amongst knowledge management and other organisational variables on organisational performance: while Devaraj and Kohli (2003), found that technology positively affects performance in hospitals, Chuang (2004), found technology did not have any association with competitive

advantage. Other conflicting results arose from the findings by Chuang (2004), found that human capital is important for performance while Seleim et al. (2007), reported a negative correlation between human capital and performance.

An analysis of empirical literature on knowledge management, reveal that no single empirical study has been conducted which includes both the mediation influence of organisational learning as well as the moderation role of organisational characteristics on the relationship between knowledge management and organisational performance. Therefore, in an effort to delve deeper into the appreciation of how knowledge management relates to organisational performance, the extant study aimed at responding to the broad questions, what is the mediation role of organisational learning on the relationship between knowledge management and organisational performance, and what is the moderation role of organisational characteristics on the relationship between knowledge management and organisational performance of companies listed at the NSE?

1.3 Research Objectives

The core objective of the extant study was to establish the relationships among knowledge management, organisational learning, organisational characteristics and performance of companies listed at the NSE. Specific objectives were:

i. To determine the influence of knowledge management on organisational performance in companies listed on the Nairobi Securities exchange.
ii. To establish the mediation role of organisational learning on the relationship between knowledge management and organisational performance in companies listed in the Nairobi securities exchange.
iii. To establish the moderating influence of organisational characteristics on the relationship between knowledge management and organisational performance.
iv. To determine whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance.

1.4 Value of the Study

The study has contributed to the extant literature towards a perception of the relationships between knowledge management and organisational performance. Another intent of the study was to establish the influence of organisational learning and organisational characteristics on the relationship between knowledge management and organisational performance. The achievement of the study objectives have contributed towards the provision of a general applicability of the variables under study in the Kenyan context and other developing economies therefore adding valuable contributions to theory.

This study has added to the existing empirical studies in knowledge management especially concerning the establishment of the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance. Scholars will use the study as a basis for additional empirical research in the area of knowledge management, organisational learning and organisational performance. Scholars will also use this study as a guide to further studies on the complementary relationships of variables in organisational resources. The study has also backed the justification and validation of the indicators applied to evaluate the individual constructs involved in the model.

The study will enhance manager's comprehension of the relationships among knowledge management, organisational learning, organisational characteristics and performance. This knowledge will be useful for purposes of policy-making and practice of human resource management. The study was applied on a wide range of organisational types in a developing economy context, therefore the findings may be generalized for use in other business sectors in emerging economies.

In terms of methodology, the study has employed the use of Structural Equation Modelling (SEM) analytical methodology particularly, the Partial Least Square SEM (PLS- SEM). In this the SmartPLS application was employed. This has added to empirical studies that have used the PLS-SEM. This statistical method is considered a second generation analysis methodology and an improvement on the first generation analytical techniques which are mainly regression based. While the first generation techniques assume that the data is free of error, SEM is designed to facilitate the simultaneous assessment of multiple dependence

interrelationships among both observable and unobservable variables while at the same time taking into account the measurement errors in the data. In addition, SEM further improves on and refines tests for mediation and moderation which have been problematic to analyse with the first generation techniques.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section presents literature of both theoretical and empirical studies that relate to knowledge management, organisational learning, organisational characteristics and organisational performance. It reviews literature to explain the relationships between the study constructs mentioned above. A summary of empirical studies on the study constructs, their findings and the gaps to be addressed are presented. Finally, the chapter outlines the conceptual model and the hypotheses to be tested.

2.2 Theoretical Foundations

This section discusses theoretical foundations underpinning the knowledge management studies. These theories include the Resource Based View (RBV), the Knowledge Based View (KBV), Dynamic Capabilities Theory, Organisational Learning Theory and the Theory of Complementarities. These theories are as a result of contributions from past studies which have molded the organisational systems and practices.

2.2.1 Resource Based View

The RBV is very useful in the perception of the relationship amongst knowledge management and organisational performance. Resource-based capability has become a crucial competitive priority in several organisational practices including organisational strategy Clemons (1991), information technology competence Mata, Fuerst and Barney (1995), and knowledge management. Resource-based capability consists of assets and competencies controlled by companies in competition with each other. These assets and competencies may possess sustained variances (Barney, 1991; Wernerfelt 1984). RBV is based on the understanding that organisations are in competition with each other for resources which are heterogeneously distributed among organisations. Barney (1991), defines organisational resources as those resources controlled by an organisation which facilitate it to generate and apply approaches for the improvement of effectiveness and efficiency. Barney (1991), formulated the VRIN (value, rare, inimitable and non-substitutable) framework, where he identified the characteristics of organisational resources that had the potential to result into a competitive edge. Such resources have to be worthwhile, exceptional, inimitable and non-substitutable. Barney (1997), later

improved on VRIN framework by generating the VRIO (value, rare, inimitable and organisation) framework. VRIO analysis seeks to answer four questions on whether a resource is: worthwhile, exceptional, inimitable, and whether the organisation is well organised to capture the value of the resource. A resource that meets all four requirements enhances sustained competitive advantage for the organisation.

According to RBV, organisations get good results and generate value when they apply tactics that make use of their internal resources and competences (Wernerfelt, 1984). The RBV considers knowledge as the greatest tactically significant resource in an organisational setting (Grant, 1996b). It further holds that an organisation controlling resources that are not common and are valuable is likely to generate a competitive edge over its competitors, and hence elevated financial performance (Wernerfelt, 1984). For an organisation to sustain its competitive edge, the resources have to be inimitable and non-substitutable. This will hinder the competition from imitating the worth of the resources and competing away their advantage (Hatch and Dyer, 2004).

The RBV has been subject from critique from some scholars. Kraaijenbrink et al. (2010), argues that sustainable competitive advantage is not a reality because organisations exist in highly volatile environments which are subject to rapid and continuous change. Therefore any competitive advantage gained is only temporary in nature. Connor (2002) posits that RBV is not applicable for small organisations. This is because most of these organisations have resources that are static in nature. These organisations can therefore not be defined as resource based organisations. Another limitation of RBV is highlighted by Priem and Butler (2001), who found that though organisations have possession of resources capabilities, they may still be overtaken in terms of performance by organisations which are better in the development of their capabilities.

The constructs in the current study namely knowledge management, organisational learning and organisational characteristics are examples of constructs that have the potential of enabling an organisation to gain a competitive edge depending on how they are combined and used.

2.2.2 Knowledge Based View (KBV)

The knowledge based view point is founded and improves on the RBV as endorsed by Penrose (1959), and expounded by such scholars as (Barney, 1991; Wernerfelt, 1984). The knowledge-based standpoint posits that the importance and functions of tangible resources will be determined by how they are combined and used. This is a function of the organisations knowledge or knowhow. Knowledge is possessed and transferred through multiple entities in organisations which include organisational culture, procedures, policy making, systems, documents, and employees (Nelson and Winter, 1982; Grant, 1996a, 1996b; and Spender 1996a, 1996b). Knowledge is understood to be a critical asset which can equip an organisation with a sustainable competitive edge over other organisations. Knowledge management involves knowledge integration in terms of efficiency, scope and flexibility. Knowledge can be managed through rules, directives, sequences, procedures and participatory problem resolution and decision making.

Knowledge-based resources are not only socially complex but in addition difficult to copy. Therefore the knowledge- based perspective holds that knowledge resources result into long-term competitive advantage and hence organisational performance. Researchers have come to a consensus that currently the most critical organisational resources are intangible in nature, knowledge being an example. Organisational resources give value when they are used as complements of other resources. This makes it difficult to categorise the contribution of individual resources to the organisational performance (Dietrickx and Kool, 1989).

This means that in addition to owning and controlling resources which lead to competitive advantage the organisation must be well equipped to manage, incorporate, and organize the various kinds of organisational resources (Grant, 1996b). Argote and Ingram (2000), however critique the knowledge management operationalization of knowledge sharing. They posit that it could be critically risky for a corporation should it find its way beyond organisational members into the hands of competitors.

2.2.3 Dynamic Capabilities Theory

The Dynamic Capabilities Theory (DCT) is considered to be an extension of the RBV. While RBV postulates that competition in firms is based on corporate assets and competences that are inimitable, uncommon, of value and non-substitutable (Barney, 2001). Schreyögg and Sydow (2010), posit that control of such resources alone is not enough to sustain a competitive edge in highly dynamic business environments. Wheeler (2002), therefore recommended a reexamination of the resource based view to incorporate this dynamism in the business environments. This resulted into the formulation of the dynamic capabilities theory to address weaknesses in RBV.

The dynamic capabilities scholars seek to understand organisations' potential to acclimatize and use their dynamic contexts. Central to that concept is an implication that, when a competitive environment is subject to rapid and unpredictable changes, organisations could achieve sustainable competitive advantage by constantly modifying and reconfiguring their capabilities and routines (Winter, 2003). In support of this perception, Eisenhardt and Martin (2000), underscore that dynamic competences are organisational and tactical procedures via which organisations augment extant resource specifications in the quest of durable competitive advantage and thus they realize new resource configurations. As such, DCT provides ample conditions for the advancement and regeneration of an organisations' supply of corporate resources, facilitating them to remain competitive through adaptation to external dynamism (Lopez, 2005).

Dynamic capabilities do not however necessarily refer to constant change, but the ability to develop, adjust or generate the internal capabilities and resources that may be required. This capability is determined by intricate organisational processes, an organisation's specialised resource positions, and the transformation directions an organisation has embraced which will in turn influence the array of possible changes to its extant competencies (Teece, Pisano and Shuen, 1997). This necessitates organisational leadership to constantly build, adapt and reconfigure an organisations' competences and resources in tune to the constantly changing business environment (Schreyögg and Sydow, 2010; Wheeler, 2002). Dynamic capabilities reconfigure organisational resources that lead to value generating strategies (Schreyögg and Sydow, 2010).

Recent literature in strategic management has explored organisational characteristics which influence the efficacy of the creation, advancement and application of dynamic capabilities. Knowledge and knowledge-centered practices have been crucial in this process. Dynamic capabilities are perceived to develop via paths that are defined based on the development of knowledge in organisations (Zollo and Winter, 2002). Therefore the dynamic competences view requires that the continuing persistent reengineering of an organisation is founded on the utilisation of extant knowledge based capabilities and the search for contemporary knowledge-based competences (Zollo and Winter, 2002; Gibson and Birkinshaw, 2004.

The dynamic capabilities theory has been criticized for various reasons. For one, the specific definition of dynamic capabilities is not clearly understood. Dynamic capabilities comprise of the competences that facilitate organisations to gain sustainable competitive advantage, however this can only be implied from the analysis of successful organisations over long periods (Winter, 2003). Another weakness is that there are limited research papers done on the development and process of what is perceived to be dynamic capabilities (Priem and Butler, 2001). Most of the research studies were conducted based on secondary information from previous studies, which had been intended for dissimilar purposes. Finally the following questions have not been clearly answered concerning the terms and interrelationships in dynamic capabilities theory; are dynamic capabilities found in resources, or in the practice of reengineering?; can routines be adopted for altering resource realignments?; do these routines transform into dynamic capabilities?; and if the routines are transformed, does this indicate 'meta' dynamic capabilities?

According to Gibson and Birkinshaw (2004), some authors have linked dynamic capabilities and organisational knowledge, proposing that dynamic capabilities that provide a basis for sustainable, constant regeneration of the organisation depend on the utilization of extant knowledge-centered competences and the search for fresh knowledge-centered competences. Dougherty et al. (2004), posit that dynamic capabilities encompass the developments of knowledge creation and acquisition, knowledge integration and knowledge realignment, and in addition, these practices are grounded on an articulate blend of organisational settings. Nielsen (2006), contends that KM procedures that adjust, refresh

and use the knowledge-based resources can denote knowledge linked dynamic capabilities of an organisation. Specifically, KM procedures form movements to and from the organisation's' supply of knowledge, thus creating new knowledge and altering the nature of knowledge-based resources in consideration.

2.2.4 Organisational Learning Theory

In the 1980s, organisational learning started being valued for its potential to increase organisational competitiveness and hence performance in organisations. Many scholars have reached a consensus that it is important that organisations learn and react promptly to the dynamic transformation of the corporate environs. Failure in this results into organisations failures (Harung et al., 1999). Schein (1999), holds that organisational learning is due to the comprehension of the transformations happening in the external business context, and the rapid acclimatization of beliefs and behaviours to these changes. Consequently, organisational learning leads to new attitudes and ways of thinking.

There are various concepts and descriptions of organisational learning, but there is no consensus on the definition (Fiol and Lyles, 1985). Of particular interest are two distinctive schools of thought; the cognitive school, which underscores the "thinking" aspect of organisational learning; and the behavioural school, which stresses on its "doing" aspect. Scholars have defined organisational learning as transformation in an array of probable behaviours (Huber, 1991). This is in line with the behavioural learning perspective which is derived from the behaviourist theory by Skinner (1972), who found that learning results into to behaviour shaping. Robbins (1994), posit that in the behavioural view, learning is taken as a course of transforming existing behaviour norms in reaction to some urgent circumstances or occurrences. The resulting behaviour change is relatively permanent. Therefore this learning perspective is as a result of adaptive learning. The alternative to behavioural learning is cognitive learning.

Cognitive learning perspective holds that learning basically results from vicarious experience as opposed to direct experience. This highlights the "thinking" element of organisational learning. Learning is therefore understood to be a complex process

involving instinct, creativity and problem resolution. In the cognitive perspective, people are understood to learn by observing, imitating other people and via figurative associations using mental images, symbols and ideas (Cherrington, 1991). Cognitive learning is hence the capability to understand the environment (Cole, 1995). In emphasis of the cognitive approach, Kolb (1984), found that a key component of learning is grasping, which involves conceptualizing and understanding which are mental processes. McGill and Slocum (1994), collaborate on this by defining organisational learning as reacting to fresh information by changing the programming by which information is handled and assessed. Sadler (1994), posit that organisational learning involves the motivational, rational and emotional facets of learning.

Organisational learning facilitate organisations to adapt in the changed environment. Effective organisational learning can lead to the improvement of organisation competences and improved competitive advantage (Inkpen, 2000). Scholars indicate that organisational learning directly impacts organisational competitiveness and financial performance. They also found positive results from numerous organisational learning practices including flexibility, participatory effort, and supportive leadership (Khandekar and Sharma, 2006; Bontis et al, 2002; Lopez et al., 2005a).

The challenge of learning via experience in the behavioral learning view is that it is complex. Learning from experience consists of individual interpretations from information acquired, at the same time using memory, previous experience, philosophies, and traditions concerning each distinctive circumstance (Levinthal and March, 1993). However there are limitations associated with personal interpretations and recollection, as well as limitations to organisational learning which include memory, conflict, geographic distribution and turnover. These make it difficult to garner learnings from personal experiences and enable them to be available to the whole organisation.

2.2.5 The Theory of Complementarities

The concept of complementarities was initially presented by Edgeworth (1926), who described organisational practices as complements of each other if doing more of one thing enhances the outcomes to doing more of another. Complementarity implies a situation of

improving returns where adopting of an activity has higher returns when simultaneously combined with a complementary activity (Choi et al, 2008). In this vein Milgrom and Roberts (1995), draw on the lattice theory and super modularity which holds that certain firm undertakings and practices are complementary and as a practice are applied together and that each enhances the contribution of the other. The complementarity concept gives a valuable perception towards the comprehension of the multifaceted relationships amongst KM strategies and practices. This means that the effect of a structure of complementary activities will result into much more than the total results of its individual parts because of the synergy created by bundling practices together.

Black and Lynch (2001), reported some synergies amongst various organisational undertakings and concluded that the way in which an organisational practice complemented other work practices was very important. In a survey of approximately 400 large firms, Bresnahan et al. (2002), gathered data on aspects of organisational structure which included, power to make decisions, employee structure, and investments in human capital. The study concluded that the workplace activities are interrelated with each other, and hence part of a complementary system.

Choi et al. (2008), found that complementarity leads to increasing returns whereby doing more of an activity results into better payoff when simultaneously engaging in a complementary activity. Crook (1993), found that different resources in an organisation are complementary to each other and therefore result into a coherent whole that is much greater than the sum total of the individual parts. The current study aimed at establishing whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is greater than the individual effect of the knowledge management on organisational performance.

2.3 Knowledge Management and Organisational Performance

Knowledge resources are considered to be a set of unique factors of production. They are differentiated from the customary production factors such as labour and land which are subject to diminishing returns. In contrast, every incremental unit of knowledge employed successfully leads to a marginal growth in performance (Gold et al., 2001). Chen et al. (2010), asserted that knowledge contributes to and is generated from innovation.

A number of scholars have conducted empirical research concerning the relationship between knowledge management and organisational performance. Choi et al. (2008) carried out a study on the effects of knowledge management strategy on organisational performance. Data was collected from 900 large and profitable Korean companies. A survey was carried out resulting into a response rate of 14.6 %. Majority of these organisations (43 %) were in the manufacturing sector. The study resulted in mixed results in that some strategies were found to have a positive correlation with organisational performance while others were negatively correlated to organisational performance. They found that when knowledge is generated and transferred throughout the organisation, it enhances the organisation's value by increasing its proficiency to respond to fresh and unfamiliar circumstances. The study was however carried out only among large and profitable organisations making it prone to a bias that could have enabled knowledge management strategies to perform above the norm. The validity of the results may not also be generalizable to organisations globally because the study was limited to large, profitable, Korean organisations.

Yli-Renko, Autio and Sapienza (2001) carried out a study on social capital, knowledge acquisition and knowledge exploitation among fledgling technology based companies in the United Kingdom. A survey was carried out on 936 firms that were between one and ten years old, that were independent, and involved in developing, commercializing or manufacturing innovative technology. 180 returned questionnaires were useable; a response rate of 19.2%. Findings revealed that knowledge procurement was positively correlated with several organisational results including innovation in new products, improved technological advancement, and cost reduction in sales. The results may not be generalizable to companies that exist in less dynamic business environments with less technology.

Locally, Ogendo (2014), examined knowledge transfer, strategy content, external environment and performance of organisations listed on the NSE. They reported that

knowledge transfer had significant impact on performance and strategy content. The study used multiple regression analysis to assess the hypotheses and hierarchical method to test the moderating effect. The study did not include organisational learning and the other indicators of knowledge management namely knowledge acquisition, knowledge sharing and knowledge application. Maseki (2012), carried out a study to examine the relationship between knowledge management and performance of commercial banks in Kenya. They collected data using a questionnaire comprising of open ended and closed ended questions. The population comprised of 43 commercial banks operating in Kenya as at 31st December, 2011 in which they used content analysis. The study established that knowledge management led to improvement of product and service quality, increased throughput, inventive capability and undertakings. Competitive capability and positioning in the business environment improved with embracing of knowledge management.

Riungu (2015), examined the effect of knowledge management practices on organisational performance of Kenyan mobile telephone companies. The researcher used open and closed ended questions to gather data. Both descriptive and regression analysis were used to analyze data. The results reveal that knowledge management practices influences organisations by improving employee knowledge, decision making, improving service provision, reducing operation costs and improving competitiveness. Riungu (2015), collected data in only 21 Kenyan mobile telephone companies. This population of study represented a very small sample of only one sector in the Kenyan economy, therefore the results may not be generalizable to other organisations.

2.4 Knowledge Management, Organisational Learning and Organisational Performance

In extremely uncertain unstable business environments, business performance seems to be more dependent on an organisations' dynamic competence to learn as well as seize new business opportunities than on aspects such as size, geographical scope, organisational structure and tangible resources (Teece et al. 1997). Knowledge management research links outstanding knowledge bases ensuing from organisational learning, to improved

organisational outcomes (Senge, 1990). In the absence of knowledge management, an organisation is incapable of advancing organisational learning capabilities (Su, Huang and Hsieh, 2004). In agreement with this, Pilar, et al. (2005), posits that knowledge becomes a crucial tactical resource to organisational learning. Firestone and McElroy (2004), posit that the connection amongst organisational learning and knowledge management is so close that it can be described as intimate. Chattel (1998), found that if an organisation is interested in achieving knowledge management functions, it has to develop a learning environment that is conducive for learning which will cultivate its human resources. Cavaleri (2004), argues that knowledge management and organisational learning are complementary and could be used in cohesion towards a bigger framework which enables administrators to leverage human intellectual capital for performance.

Liao and Wu (2009), studied the relationship among knowledge management, organisational learning and organisational performance. They concluded that organisational learning intervenes the association between knowledge management and organisational performance. Data for the study was collected in knowledge intensive firms which made them more likely to value and use knowledge management hence, they could have been prone to biased results. The results could have also have been subject to bias because the sample of respondents was drawn from organisations listed in the Common Wealth Magazine's top 1000 manufacturers and top 100 financial firms. Hence the study did not incorporate firms that had poor performance reports. This made the study less generalizable across different companies.

2.5 Knowledge Management, Organisational Characteristics and Organisational Performance

Knowledge management competences (knowledge capturing, knowledge conversion, and knowledge application) are imbedded in organisational process and are resultant from patterns of organisational configuration and culture (Liao and Wu 2009). In Kenya, Adan (2013) conducted a case study on the influence of knowledge management enablers on organisational performance in Kenya Revenue Authority. Results indicate that

organisational performance is associated with the corporate cultural factors such as collaboration, trust, learning and leadership. The results further showed that structural issues had a moderate to high effect on organisational performance. This study did not test whether these knowledge management enablers had a moderating effect on the relationship between knowledge management and performance. Neither did it consider the mediation influence of organisational learning in the relationship between knowledge management and organisational performance. The study was a case study giving rise to the need to carry out a study that includes many organisations from different sectors to improve the reliability of the findings Content analysis was applied for the study. Content analysis may be limited by availability of materials to analyze. It is also difficult to link data items to each other (Cavanagh, 1997). This being the case the findings cannot be robust enough to be generalizable across organisations.

Lai (2013) found that organisational structure had a moderating influence in the relationship between knowledge management and performance, while structure did not have a direct relationship with knowledge management capabilities or job performance. The study made use of secondary data from Survey Research Data Archive. It may be necessary to replicate a study using primary data. The study was limited to shipping companies and port authorities of international ports in Taiwan, it therefore may not be generalizable to other organisations or cultural setups. It's notable that only job performance was analyzed, other indicators of organisational performance were not analyzed. In conflict with Lai (2013) findings, Sheng and Tian (2010), found that organisational structure and organisational effectiveness had a negative relationship.

Chen et al. (2010), carried out a study on knowledge management and innovativeness. They collected data using a questionnaire from a sample of 146 companies drawn from the top 5000 Taiwanese firms listed in the year book published by The China Credit Information Services Corporation. Regression analysis was applied to measure the relationships. They reported that there was no interaction effect of knowledge sharing with either formalisation or centralization. They revealed that the interaction terms of knowledge sharing and organisational structure were insignificant. They also found that formalisation and centralization did not provide a context that was strong enough to

stimulate knowledge sharing leading to innovation. Organisational climate and structure were found to be mediators in the relationship between knowledge management and innovativeness. The study only involved top performing Taiwanese organisations therefore it is not generalizable across organisations. In addition, the study did not include organisational learning and overall organisational performance.

A case study was conducted by Allame, Nouri, Tavakoli, and Shokrani (2011), to establish the impact of organisational culture on the success of knowledge management systems implementation. A total of 98 questionnaires were collected from employees of various branches of Saderat Bank in Iran. Findings indicated that organisational culture was not a mediating in the relationship amongst knowledge management and organisation benefits. It also found that knowledge management and organisational benefits had a high positive mutual correlation. The study did not test whether organisational culture moderated the relationship between knowledge management and performance. Another limitations was that the study involved only one bank. This could have made the study prone to bias. In addition, because it was a case study, the results may not be generalized to other types of businesses.

Hamid (2008) carried out a study to determine whether the relationship between human capital and learning resulted into competitive advantage. The study concluded that human capital is a crucial asset in an organisation. Hatch and Dyer (2004) investigated whether human capital and learning resulted into competitive advantage in USA, Asia and Europe. They collected data among 25 semi-conductor manufacturing industries sampled from a list of world class manufacturers. The questionnaires were sent only to those who agreed to participate. As such the response rate was 100%. The findings revealed that managing the human resource selection, development, and deployment could lead to significant improvement of learning and consequently competitive advantage. Human capital development through training resulted in more productive employees who can meaningfully participate in the learning activities of the firm. Surprisingly in contrast to these findings Seleim et al., (2007), found there was a significantly positive correlation between the number of departing superstar developers and organisational performance.

Gold, Malhotra and Segars (2001), studied knowledge management and organisational capability perspective in the USA in an effort to determine their relationship with organisational effectiveness. Each capability dimension was found to contribute uniquely to the overall capability and no single dimension of infrastructure or process capability was found to be singly responsible for organisational effectiveness. The findings implied that organisational effectiveness was as a result of the complementary relationship of infrastructural and process capabilities. An earlier research paper by Hansen, Nohria and Tierney (1998), posit that over- emphasize on infrastructural capabilities led to loss of efficiencies in the acquisition and transfer of knowledge. The extant researcher finds this surprising since infrastructural capabilities are expected to enhance performance. Thus it is expected that the more the emphasize on infrastructural capabilities the better the performance.

Rasula et al. (2012), studied the effect of knowledge management on organisational performance in Slovenia and Croatia. The sample involved 3089 companies. 329 respondents returned duly filled questionnaires. They found that knowledge management heavily depends on technology and that information technology had a positive indirect influence on knowledge management adoption. In conflict with Rasula et al. (2012), (Chuang, 2004) found no correlation between technical knowledge management resource and competitive advantage. The summary of knowledge gaps is presented in the following section in Table 2.1

2.6 Knowledge Management, Organisational Learning, Organisational Characteristics and Organisational Performance

In their effort to determine the relationships among transformational leadership, organisational learning, knowledge management and organisational innovation, Noruzy, Dalfard, Azhdari, Shirkouhi, and Rezazadeh, (2012), collected data among 106 manufacturing companies in Iran that were randomly selected from a population of 180 companies. They distributed 380 questionnaires and achieved a response of 280 questionnaires, a response rate of 73 %. Structural equation modelling was applied for data analysis. Their results revealed that transformational leadership was positively related to

knowledge management, organisational learning was positively related to knowledge management and transformational leadership was indirectly related to organisational performance through knowledge management and organisational learning. Similarly transformational leadership and innovation were found to be directly related to organisational performance. The study was however subject to social desirability biases, common method variance, and response distortion due to ego defense tendencies because data collection was conducted through self- reports. The sampling of the study imposed limitations as to the generalizability of the obtained results as it was done only on manufacturing firms in Iran. In this study, organisation characteristics were not tested.

Bierly and Chakrabarti (1996), reported a complementary association amongst KM strategies which resulted into improved organisational performance. In contrast, Choi et al. (2008), concluded that bundles of KM strategies had no effect on organisational performance, which implied non-complementarity relationships between KM strategies. Clarifying the relationships among KM strategies remains an important research issue.

Gold et al. (2001), conducted a study on effective knowledge management from the perspective of organisational capabilities. 1000 questionnaires were administered to senior executives of large firms that had sales of over 100 million dollars annually. 325 responses were deemed usable. Data analysis was done using Structural equation modelling. They found that knowledge infrastructure capabilities constructs as well as knowledge process architecture are preconditions for organisational effectiveness. However their findings indicate that no single dimension of these constructs is adequate in describing organisational effectiveness. Each dimension contributes uniquely to the overall capability. This is in agreement with the theory of complementarities.

Table 2.1: Summary of Knowledge Gaps

Study	Focus	Methodology	Findings	Knowledge Gaps	Focus of Current Study
Gold, Malhotra and Segars (2001)	KM and organisational capability perspective.	Used a questionnaire to collect data and factor analysis and SEM	Each capability dimension was found to contribute uniquely to the overall capability	The study did not include organisational learning and organisational performance	This study included organisational learning and organisational performance.
Choi, Poon and Davis (2008)	The effects of KM strategy on organisational performance: A complementarity theory based approach.	A six point Likert type scale questionnaire was used. Data was analysed through the use of association analysis technique	The results supported a complementary relationship between external oriented and internal oriented knowledge management strategies.	This study did not incorporate organisational learning and organisational characteristics.	The current study involved KM, organisational characteristics, organisational learning and organisational performance. It used of PLS-SEM to analyse data.
Chen, et al. (2010)	KM and innovativeness: The role of organisational climate and structure from the social capital and social network perspectives.	A questionnaire was used to collect data which was analysed through hierarchical regression modeling	Organisational climate and structure moderated the relationship between KM and Innovativeness. Moderation role of organisational climate amongst knowledge creation and was insignificant.	The study did not measure organisational performance, organisational learning and human capital, nor did it assess other measurements of performance	The current study included organisational learning, human capital and organisational performance. It also includes more measure of performance.

Study	Focus	Methodology	Findings	Knowledge Gaps	Focus of Current Study
Zeng, Yang and Maclean (2010)	Linking organisational culture, structure, strategy and organisational effectiveness: The mediating role of knowledge management	SEM was used for data analysis	The study had mixed results; while there was a positive relationship between KM and effectiveness, there was a negative relationship between structure and KM, and structure and effectiveness. KM was found to partially mediate between organisational structure and effectiveness	This study did not investigate the mediation role of organisational learning on the association amongst knowledge management and performance. It also did not measure organisational performance	This extant study analysed the mediation role of organisational learning on the relationship between KM and performance and the moderating role/interaction effect of organisational characteristics on the relationship between KM and organisational performance.
Allame, Nouri, Tavakoli, and Shokrani (2011)	Effects of organisational culture on success of KM systems; a case study of Saderat bank, Iran (2011)	Two questionnaires were used to collect data which was then subjected to regression analysis	Though KM and organisation benefits have a high positive correlation, organisational culture had no mediating role on the relationship between Km and organisational benefits	The study did not measure the effect of other organisational characteristics such as structure, IT infrastructure, and human capital. It did not include organisational learning.	The current study included organisational structure, IT infrastructure and human capital. It also included organisational learning.
Maseki (2012)		Data was gathered through a questionnaire and analysed through content analysis	KM greatly affects performance of commercial banks.	It did not include organisational learning, nor organisational characteristics.	The current study used Structural equation modelling which has been found to be more robust than content analysis.

Study	Focus	Methodology	Findings	Knowledge Gaps	Focus of Current Study
Adan, (2013)	The effects of KM enablers on organisational performance; a case study of Kenya Revenue Authority.	Both secondary and primary data was collected. Analysis was done through both descriptive and content analysis	Structure, culture, people and IT infrastructure were found to be KM enablers that influenced organisational performance	This was a case study and results cannot be considered generalizable to other organisations. Analysis was done through descriptive and content analysis which are first generation analysis techniques.	The study conducted a cross sectional survey in all organisations listed on the NSE as at 2012. It employed the use of SEM which is a second generation analytical tool hence an improvement as compared to the first generation tools.
Lai (2013)	The moderating effect of organisational structure in the relationship between KM and job performance for international ports in Taiwan.	Secondary data was used. This data was analysed using a multi-step approach which included factor analysis and structural equation modeling.	Structure was found not to affect job performance directly. However structure was found to moderate the relationship between KM and job performance.	It only focused on job performance and did not consider other performance indicators. It only used secondary data hence results may be outdated. Did not include organisational learning and other organisational characteristics	This study made use of primary data and incorporated organisational performance. It also included organisational learning, culture, human capital and IT infrastructure.

2.7 Conceptual Framework

The conceptual model is founded on the theoretical underpinnings of RBV and particularly its extension into the KBV. The theory of complementarities is key to the current research paper. The study also applies the organisational learning theory, dynamic capabilities theory and knowledge gaps from the past empirical research. All these assert the significance of organisational constructs and particularly their use as complements of each other towards the enhancement of organisational performance. The relationships among the four constructs namely knowledge management (independent construct), organisational learning (mediating construct), organisational characteristics (moderating construct) and organisational performance (dependent construct), is presented in a conceptual model in Figure 2.1.

There are four hypotheses in this study; (H1) proposes that there is a relationship between knowledge management and organisational performance. (H2) proposes that organisational learning mediates the relationship between knowledge management and organisational performance. (H3) proposes that the relationship between knowledge management and organisational performance is moderated by organisational characteristics. Central to this study is (H4) because it propositions a complementary relationship of all the four construct. This hypothesis states that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance will be significantly greater than the individual effect of knowledge management on organisational performance.

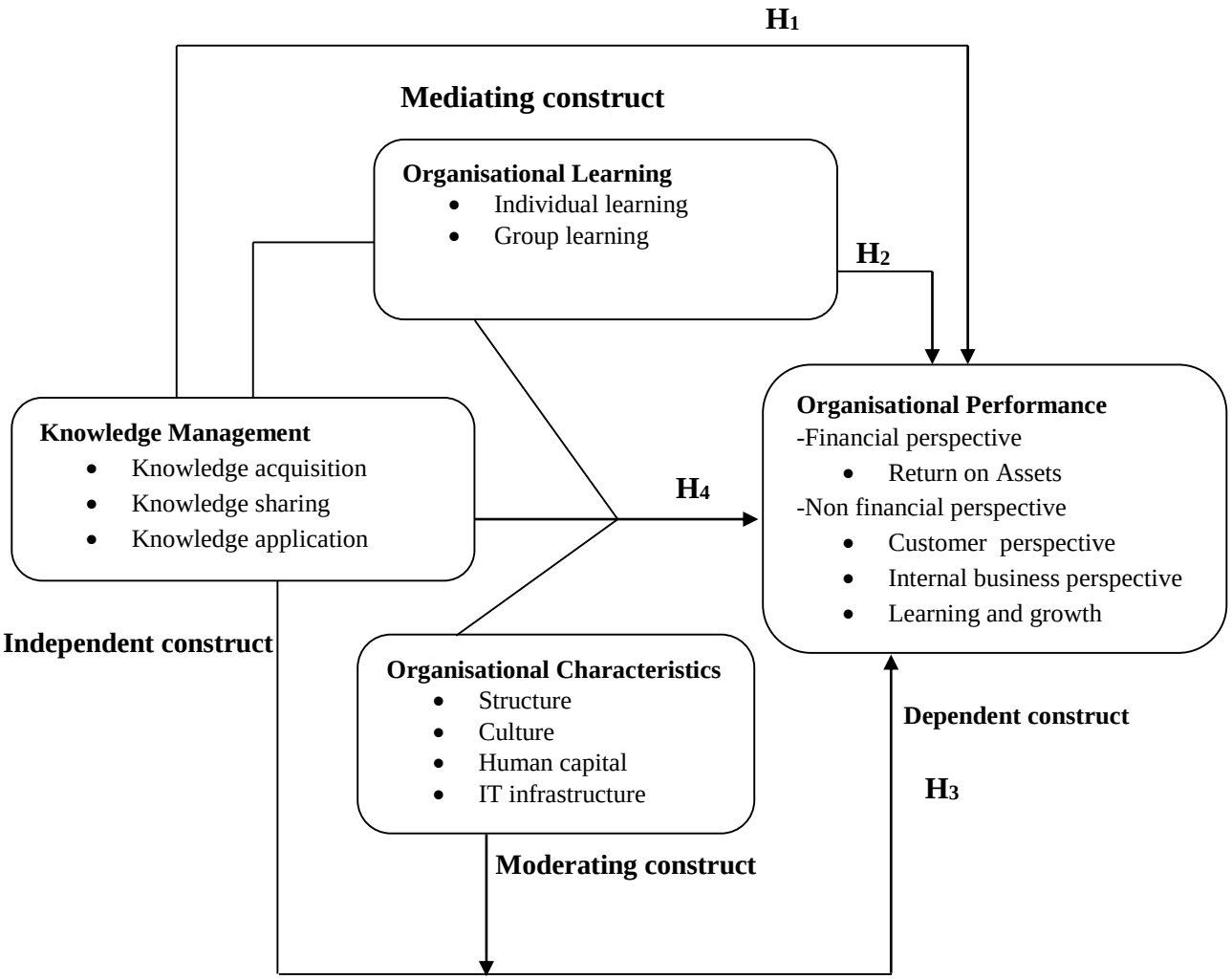


Figure 2.1 Conceptual Model

Source: Current Researcher (2018)

2.8 Conceptual Hypotheses

H_1: There is a relationship between knowledge management and organisational performance.

H_2: Organisational learning mediates the relationship between knowledge management and organisational performance.

H_3: Organisational characteristics moderate the relationship between knowledge management and organisational performance.

H_4: The complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, a comprehensive discourse on the research methods and approaches employed to conduct this study is outlined. It specifically presents the research philosophy that was adopted, research design and tool that were used, population of study and the sources of data, methods employed for data gathering, the operationalization of research constructs, test of validity and reliability of the data gathering instrument, and data analysis using structural equation modelling, particularly the SmartPLS application.

3.2 Research Philosophy

There are two extreme research philosophies preferently used in social sciences. These are phenomenology and positivism. According to Cooper and Schindler (2008), the phenomenological approach is mainly qualitative and focuses on the immediate experience. In phenomenology the researcher starts from the unknown and is open to and trusts their own experience. The researcher makes conclusions by interpreting experiences of their interaction with the research phenomena. Phenomenology describes things as they are and not as the researchers thinks they are. Pure phenomenological research is used as the basis for practical theory and seeks to describe rather than explain and starts from a perspective free from hypotheses (Husserl, 1970).

Positivism is a philosophical approach that is based on the process of hypothesis testing (Bryman and Bell, 2003). Comte and Bridges (2009) assert that positivism allows for the operationalization of various concepts and generalisation of the results. Positivism holds that knowledge consists of only phenomena that can be observed and measured. King, Keohane, and Verba (1994), posit that positivism is based on quantitative research which uses numbers and statistical methods. It seeks measurements and analysis that are easily replicable by other researchers. Other research philosophies include pragmatism, social constructionism, and critical realism.

The current study sought to establish possible relationships with emphasis on the complementary relationships among the identified constructs namely knowledge management, organisational learning, organisational characteristics and organisational performance. This study has been conducted based on the positivist philosophy as opposed to the phenomenological philosophy. The positivist approach is suitable for the extant research since it has employed objective testing of theoretical hypotheses that have been formulated as predictions of objectively observed phenomena. Hypotheses testing has been done with the intent of establishing the relationships among knowledge management, organisational learning, organisational characteristics and organisational performance.

3.3 Research Design

The research design consists of an array of dimensions of the research process including expressions of inter-relationships amongst constructs (Bryman and Bell, 2003). This study used a cross sectional survey research design. This research entailed collecting of data from the population of study during a period of time and drawing deductions from this data. According to Cooper and Schindler (2008), a cross-sectional survey is used to collect data from a selected population. This data is used to explain an existing phenomenon through enquiry on the respondent's views, behaviours, attitudes, or ideals.

The cross sectional survey was chosen for this study because it involves collecting data at one time from all the firms listed at the NSE by the end of 2015. The design offered the researcher an opportunity to capture population characteristics and test hypotheses quantitatively and qualitatively. Similar studies conducted by Shabarati, Jawad, and Bontis (2010); Ongore (2008); and Letting (2011), utilized the cross sectional survey method.

3.4 Population of the Study

The extant study's 'population involved all organisations that were listed on the Nairobi NSE which stood at 61 in number by the end of 2015. Therefore this study applied a census approach. This is because the organisations listed at the NSE were too few to qualify for a sample extraction. According to Bartlett, Kotrlik and Higgins (2001), the minimum suitable population for sampling is 100 elements. The current population stood at 61 organisations only and hence a census was most appropriate. The firms listed on the NSE

were chosen because they cut across all sectors of the economy namely, agriculture, vehicles and fittings, banking, commercial and services, building and allied, energy and petroleum, insurance, industrial and allied, telecommunication and technology, and growth enterprise market. Cabrita and Bontis (2008) recommended that a suitable population should offer the advantage of comparison of companies within the same industry and across different industries, therefore companies listed on the NSE listed are appropriate.

The firms listed on the NSE are also compliant to statutory requirements for listing by CMA, thus objective and reliable financial performance data is available. This being the case they are also more likely to conform to the principles of governance as required by law. Data on corporate financial performance is readily available in the NSE annual publication, this data is relatively objective and reliable (The NSE handbook 2015-2017).

3.5 Operationalization of Variables

This section discusses the operationalization of the research constructs as depicted in the conceptual model presented in Figure 2.1. The constructs were operationalized and evaluated using a five-point Likert type scale. This is the psychometric scale usually used in research employing questionnaires. To operationalize the four study constructs, the current study measured the extent of agreement with the statements in the questionnaire. The questionnaire covered the constructs; knowledge management, organisational learning, organisational characteristics and organisational performance of organisations listed on the NSE.

The organisation was the unit of analysis in the current study. The independent construct knowledge management was operationalized using the dimensions of knowledge capturing, knowledge sharing and knowledge application. Organisational learning (mediating construct) was operationalized using individual learning, group learning adapted from (Turyasingura, 2011). Organisational characteristics (moderating construct) were operationalized into structure, culture, human capital and IT infrastructure. Organisational performance was measured according to the balanced score card as used in (Mels, 2010). This was operationalized into financial performance (Return on Assets),

customer perspective, internal business perspective, learning and growth. A summary of the operationalization of variables is presented in Table 3.1.

Table 3.1: Operationalization of the Study Variables

Variable	Operational definition	Indicator	Questionnaire item
Knowledge management; (Independent construct)	Knowledge acquisition	Extent to which the organisation facilitates acquiring of new knowledge	2.1 (1-3)
	Knowledge sharing	Extent to which the organisation facilitates sharing of knowledge, channels used to share knowledge and extent to which employees regard knowledge as an organisational asset	2.1(6-9)
	Knowledge application	Extent to which the organisation facilitates and encourages application of knowledge for problem solving and productivity	2.1 (10-13)
Organisational learning; (Mediating construct)	Individual learning	Extent to which employees help each other learn, are given time to support learning, give honest feedback to each other, their views are listened to by management and spend time building trust among each other.	2.2 (1-4)
	Group learning	Extent to which teams/ groups have freedom to adapt their goals to emerging needs, change their perception due to group discussions and information available, are confident that their organisation will act on their recommendations	2.2 (5-7)
Organisational characteristics; (Moderating construct)	Structure	Extent to which the organisational structure is formal, extent to which the structure is centralized, leaders are mentors and coaches, employees are involved in decision making.	2.3 (1-3)
	Culture	Extent to which organisation's jobs are conducted according to defined rules and procedures, organisations continually adopts new and improved ways to work. Extent to which it is easy to coordinate projects across functional units, organisations delegate authority, organisations continuously invests	2.3 (4-8)

Variable	Operational definition	Indicator	Questionnaire item
		in the skills of employees, working in the organisation is like being part of a team, information is widely shared, the organisation's customer input directly influences decisions, and the organisation's competitiveness is measured in comparison to other organisations.	
	Human capital	Extent of employee's knowledge, experience and knowledge.	2.3 (9-13)
	IT infrastructure	Extent to which the organisation uses IT tools to store, share and use data on projects, tasks, activities, suppliers, customers. Extent to which IT tools are user friendly, enable effective work, and help prevent loss of knowledge	2.3 (14-17)
Organisational performance; (Dependent construct)	Financial performance	Return on Assets; Earnings generated from invested capital.	Section 6
	Customer perspective	Extent to which the organisation increases its market share, the customer retention rate, handling of customer complaints, extent of repeat business and new customers due to positive customer referral.	2.4 (6-10)
	Internal business perspective	Extent to which research and introduction of new products/services is continuously undertaken, the organisation has a larger market share than competitors, extent to which inwards and outwards logistics, quality control, IT and accounts are well managed.	2.4 (11-16)
	Learning and growth	Extent to which the organisation is committed to continuously add value to the products/ services, design new products, improve technology in line with the organisations needs and carry out research on new products.	2.4 (24-28)

3.6 Data Collection

This study made use of both primary and secondary data. Data was collected through a structured questionnaire. To collect primary data from respondents a five point Likert type scale was used. In this scale, 1 represents "not at all"; 2 "to a small extent"; 3"to a moderate extent"; and 5 "to a very large extent". The questionnaires were distributed and responses collected by the researcher.

Respondents consisted of an individual manager from each company with an emphasis on Human resource managers and General Managers among others. These managers were chosen as the preferred respondents because they were perceived to have access of the information required for this study. In addition the researcher used secondary data on financial performance from the financial reports of the year ended December 2015. These were readily available from the organisational financial online reports with an exception of a few organisations.

3.7 Data Preparation and Analysis

This section gives details on data preparation, Data preparation included checking of the questionnaire for any missing data, coding of the data, data cleaning which included coding and replacing missing data and reverse coding some data as necessitated by reverse questions in the questionnaire.

Descriptive analysis were computed for the demographic characteristics of the organisations and the respondents. The study consequently applied the SEM analytical technique for further analysis. In SEM there are two major method choices that may be used. These are the covariance based structural equation modeling (CB-SEM) and Partial Least Squares structural equation modeling (PLS-SEM). The current study has applied PLS-SEM.

3.7.1 Structural Equation Modeling (SEM)

Rigdon (1998), posits that, SEM has emerged as a prominent choice among statistical techniques used in academic literature in various fields. SEM is configured to enable researchers to simultaneously assess multiple interrelated dependency relationships

amongst a number of constructs while accounting for measurement error. Therefore it offers many advantages over the standard analytical techniques and hence providing an improved general framework for linear modeling. This has led to widespread use of SEM as a statistical analysis tool of choice in academic research in various fields.

SEM is a second generation multivariate data analytical tool used in the testing of theoretically founded linear causal models. We note that the first generation analysis methods are regression based and assume that the data is error free. Examples of these include multiple regression, logistic regression, and analysis of variance, cluster of variance, exploratory factor analysis, and multidimensional scaling. In contrast SEM attempts to identify the error component of the data in the measurement model. In addition SEM offers a researcher the flexibility to model relationships amongst numerous predictor and criterion constructs, unobservable latent constructs, model measurement errors in manifested constructs, and the statistical evaluation of theoretical and measurement assumptions in comparison to empirical studies (Chin 1998). According to Ali (2016) SEM combines characteristic of factor analysis and multiple regression to simultaneously assess direct and indirect effects on independent and dependent constructs.

SEM is appropriate because it can be employed to measure unobservable hard to measure latent constructs. SEM concurrently assesses and approximates causal interactions among several latent constructs (Gefen, Straub and Bourdreau, 2000). SEM consists of a measurement model (outer model) and a structural model (inner model). The measurement model stipulates the interactions among the latent constructs with the associated indicators. The structural model represents the interactions amongst the independent and dependent latent constructs. Figure 3.1 is a presentation of a structural equation model.

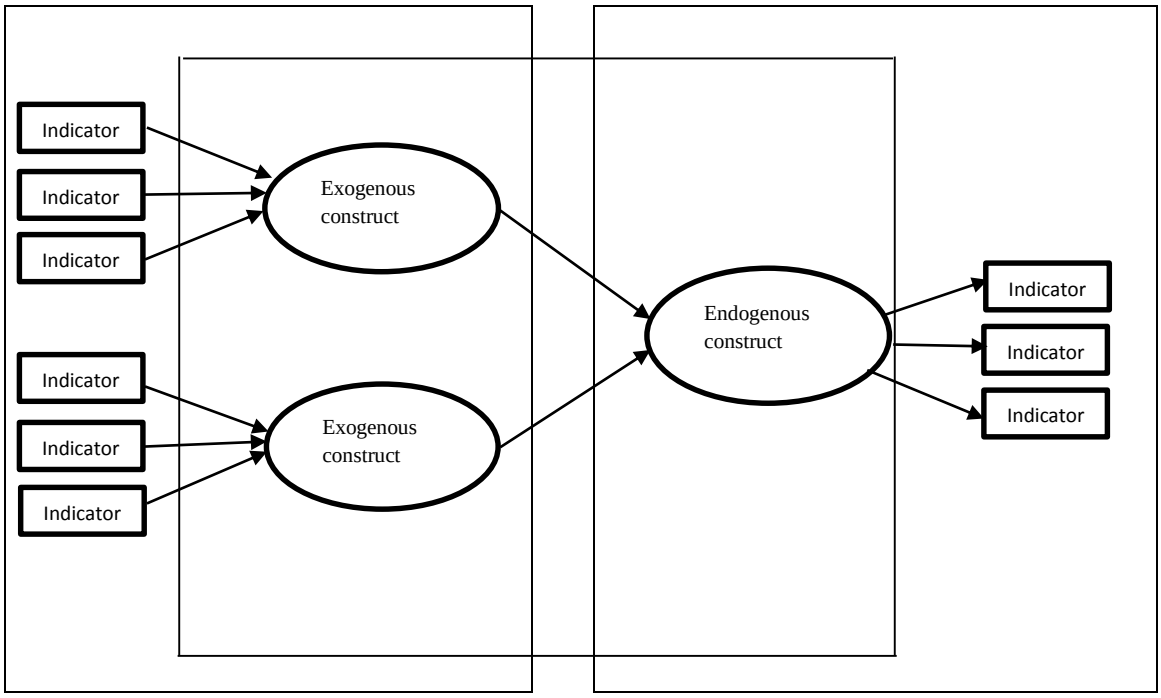


Figure 3.1: A structural Equation Model

Source: Adapted from Hair et al. (2014)

There are two main alternatives used in structural equation modeling: Partial least square SEM (PLS-SEM) and Covariance based-SEM (CB-SEM). The two approaches are differentiated by the fundamental statistical assumptions and the type of assessment statistics they generate (Gefen et al., 2000). According to Kline (2011), CB-SEM has two main objectives; to explain the patterns of covariance among a set of manifest variables (indicators), and to give an explanation for as much of that variance as possible within a specific research model. It's important to note though that all SEM models have a covariance structure.

The second approach to SEM analysis is PLS-SEM. Hair et al. (2012), reveals that PLS SEM has currently gained popularity in many fields. This approach was intended as a prediction oriented alternative to CB-SEM and operates free from the assumptions on data and specifications of associations demanded by CB-SEM (Dijkstra 2010, Rigdon 2012). Hair et al. (2012) found that PLS -SEM has the ability to cope with problematic modelling concerns that normally arise in the social science research. PLS-SEM is efficient when applied to estimate path models consisting of several constructs, many structural path relationships and/ or constructs with many indicators. In structural equation modelling, constructs represent conceptual variables in statistical models. Constructs should be taken

as phenomenon articulated from empirical data, aimed at facilitating empirical evaluation of hypotheses concerning the concepts (Rigdon, 2012). Wickens (1972), posits that all the measures of the conceptual constructs are just approximates of the conceptual constructs and in agreement with this finding, Gilliam and Voss, (2013), concluded that the constructs will not be a perfect representation of the conceptual variables hence there will remain some extent of ambiguity in the construct definition.

PLS SEM is especially appropriate when small size samples are used. In such circumstances PLS SEM realizes higher levels of statistical power and attains convergence more times than CB SEM (Henseler, 2010). Advantages of PLS SEM include enabling flexible handling of a model with more elements such as moderating and mediating constructs, nonlinear relationships or hierarchical component models (Kleen and Wetzel, 2012). According to Henseler and Sarstedt, (2013), PLS-SEM takes explained variance to be a sufficient measure of fit when research draws on secondary data and when the data is non normal. Currently researchers qualify PLS-SEM as a vigorous method of SEM model estimates as demonstrated by its growing use in marketing and business research (Hashim, 2012).

PLS-SEM ought to be considered as an alternate technique of SEM when the data does not adhere to the restrictive distributional assumptions. The distributional and informational demands of CB-SEM can be impractical for a number of areas of investigation particularly in social sciences. Consequently, both SEM approaches should be regarded as complementary and not opposing statistical approaches (Hashim, 2012; Hair, Ringle, and Sarstedt, 2011). Hair et al. (2011), provide a proposition as an appropriate guidance for choosing either CB-SEM or PLS-SEM studies using SEM analytical method. According to Hashim (2012), PLS-SEM is used when the following conditions apply: When the research purpose is aimed the extension of an existing theory, when the study's model has both formative and reflective constructs, where the model is complex because it contains several constructs, when data fails to achieve distributional assumptions and when the size of the sample is small.

3.7.2 Reflective Models

The model in the current study is a reflective model. A path model is described as reflective if the causal arrows in the path originate from the latent construct towards the observed items. According to Bollen (1989), in a reflective model, measurement items are error

prone manifestations of the underlying construct. The association amongst the construct and the measurement items in the model is denoted by arrows originating at the construct and terminating at the indicator. This relationship is conveyed in the subsequent equation.

$$x = l.\ y + e$$

Where

x is the observed indicator variable

y is the latent variable (construct)

l the loading l is a regression coefficient quantifying the strength of the relationship between x and y

e represents the random measurement

Reflective indicators are known as effect indicators. These can be taken to represent a sample of all the probable indicators of the latent variable (Nunnally and Bernstein, 1994). According to Anderson and Gerbing (1988), in reflective models indicators represent the sum total of all possible measurement items which reflect the latent variable being evaluated. The reflective model assumes that the construct is the reality and the indicators are a sample of all possible indicators of that reality. Edwards and Bagozzi (2000), further find that since all the indicators reflect the same construct they should all correlate highly with each other. In support of this (Jarvis, 2003), concludes that this being the case, the indicators representing one construct are interchangeable with each other and dropping of any one of them does not change the definition of the construct as long as the construct meets the reliability requirements. Henseler et al. (2005), posits that the purpose of reflective measurement model assessment is ensuring the reliability and validity of the constructs measure. Figure 3.2a) presents a simplified reflective model, while Figure 3.2d presents the study's original structural model which is a reflective model.

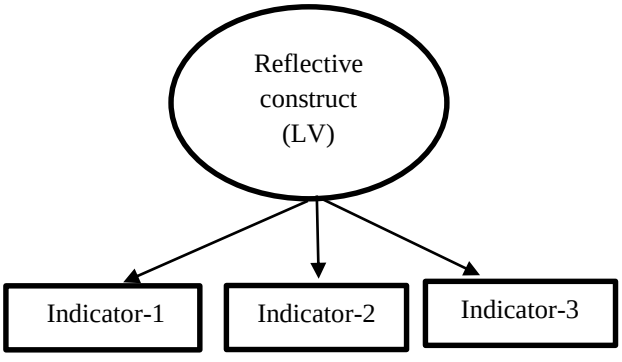


Figure 3.2a: Simple Reflective Model

Source: Adapted from Hair et al. (2014)

3.7.3 Formative Models

In a formative measurement model, the indicators form the construct by means of linear combinations. Any variation of the indicator loading automatically causes a variation in the constructs value (Borsboom, Mellenbergh, and Heerden, 2003). This implies that the latent variable is composed of the observable measures. Formative models assume that the measurement items are the actual reality; with each item representing an aspect of meaning of the latent construct. The set of indicators therefore represent all dimensions of the latent construct. Dropping an indicator implies the dropping of a dimension in the latent variable, therefore completely altering its meaning (Anderson and Gerbing, 1988). Figure 3.2b presents a simplified formative model, while Figure 3.2c presents a SEM model with a combination of reflective and formative constructs.

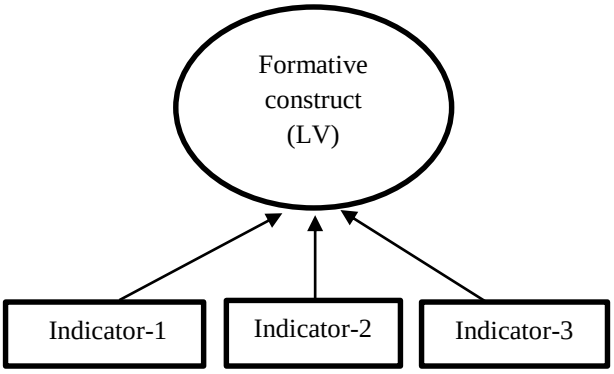


Figure 3.2b: Simple Formative Model

Source: Adapted from Hair et al. (2014).

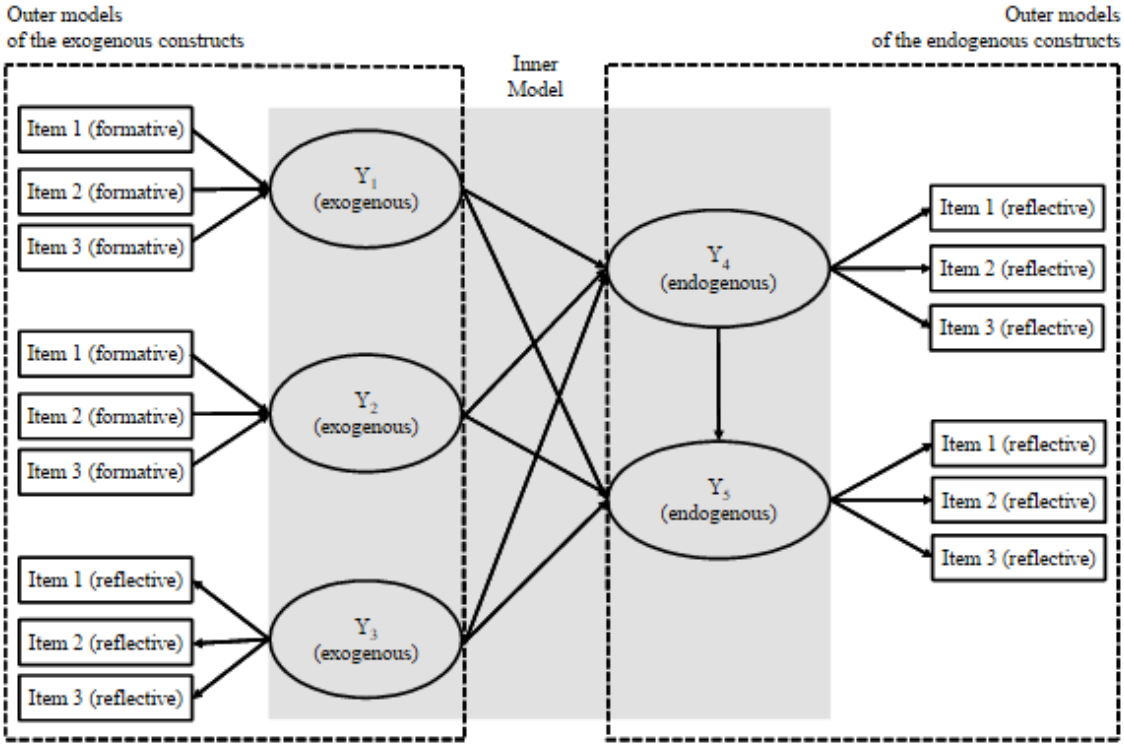


Figure 3.2c: SEM Model with Formative and Reflective Constructs

Source: Hair et al. (2014).

3.8 The Current Study's PLS-SEM Model

In view of the characteristics of PLS SEM discussed, the current study employed the Partial Least Squares approach of SEM (PLS- SEM) as opposed to Covariance Based SEM (CBSEM). The current study's model is a reflective model that has four latent constructs with reflective indicators. This means that the indicators are a representative sample of all probable indicators which reflect the reality of the latent construct they are measuring. The current study was conducted using a census survey with only 61 companies as the total population. This being a small data frame PLS SEM was the suitable statistical analysis technique, PLS- SEM works relatively well with small sample sizes (Chin and Newsted, 1999). The following section presents the appraisal of the current study's measurement model and consequently the structural model.

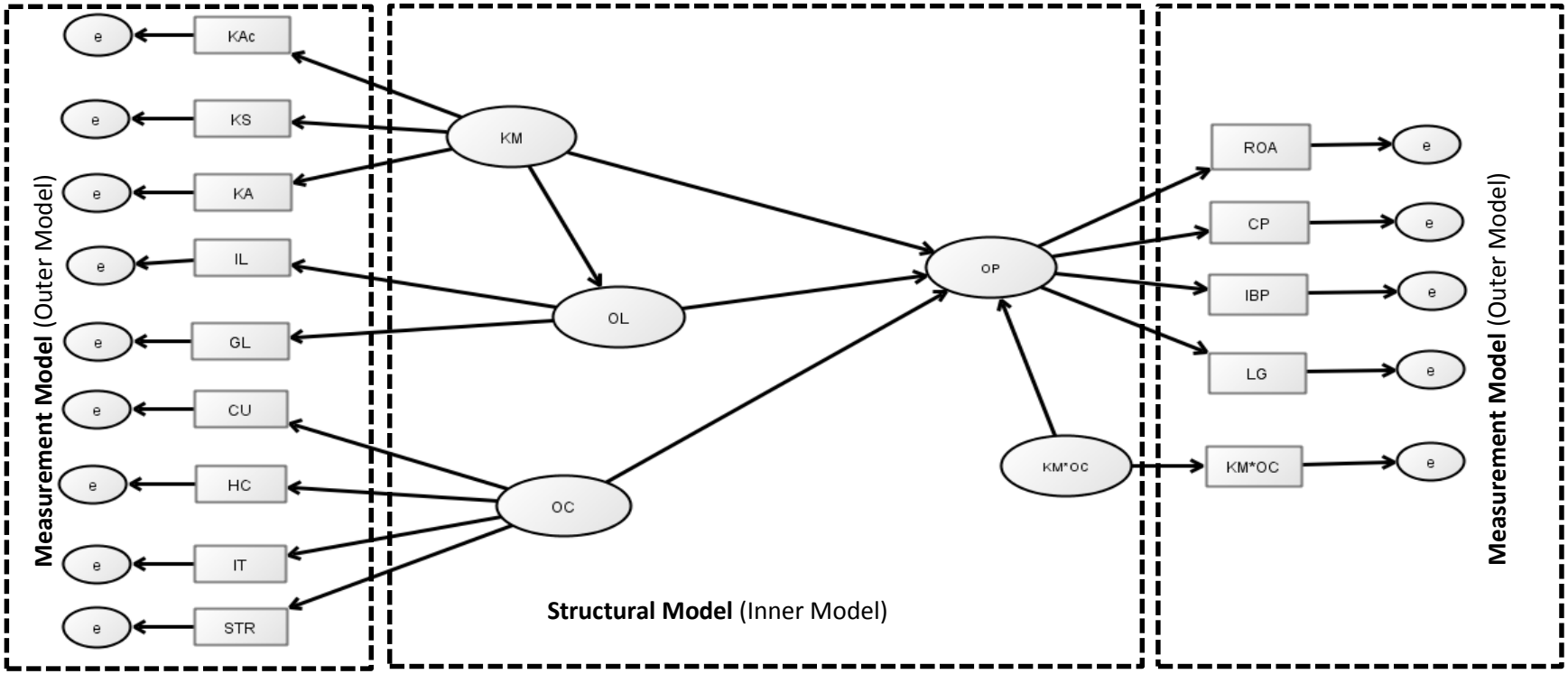


Figure 3.2d: The Study's Original Structural Model

Source: Current Researcher (2018)

KEY: KAc knowledge acquisition; **KS** knowledge sharing; **KA** knowledge application; **IL** individual learning; **GL** group learning; **STr** structure, **CU** culture; **HC** human capital; **IT** information technology infrastructure; **ROA** return on assets; **CP** customer perspective; **IBP** Internal business process; **LG** learning and growth; **KM**; knowledge management; **OL**, Organisational learning (mediating construct), **OC**, organisational characteristics (moderating construct) ; **OP** Organisational Performance

3.9 Reflective Measurement Model (Outer Model) Assessment

Fit statistics for PLS-SEM focus on the differences between; the manifest indicators and the exogenous constructs (approximated constructs), values of the endogenous constructs and the values predicted by the model in question. As a result, a researcher using PLS-SEM depends on measures expressing the model's predictive capabilities to evaluate the model's quality. More specifically, the assessment of the measurement and structural model in PLS-SEM, is based on a set of nonparametric assessment and hence employs methods such as bootstrapping and blindfolding.

Reflective measurement models are assessed on their internal consistency reliability and validity. The particular measure used to assess reliability is composite reliability. To assess validity, convergent validity and discriminant validity measures are used (Hair et al. 2014). These measurements are elucidated in the consequent sections.

3.9.1 Indicator Reliability

Reliability is an assessment of the extent to which a research tool yields dependable outcomes with recurrent trials. It is aimed at estimating the extent to which a measurement remains unaffected by random error. When the instruments are reliable, the researcher is assured that transient and situational factors will not interfere with the measurement. This means that these instruments are robust and are reliable for use at dissimilar times and conditions (Cooper and Schindler, 2006).

In a reflective model the indicator loadings (outer loadings or measurement loadings) are examined to determine indicator reliability. In SmartPLS data is standardized so that the indicators loadings vary from 0 – 1. To achieve the loading requirement for indicator reliability, the loadings should be 0.7 and above. This indicates that the construct contributes to over 50% of the variance in the indicator ((Henseler et al., 2012). In view of this, any indicator with loadings below 0.7 was dropped towards improvement of indicator reliability (Hair et al., 2014).

3.9.2 Construct Internal Consistency Reliability/ Composite Reliability

Internal consistency reliability was evaluated using the composite reliability measure which is a less conservative measure as compared to Cronbach’s (1951) alpha measure. The Composite reliability measure ought to be 0.7 or higher. Higher levels in terms of

composite reliability indicate higher levels of internal consistency (Bagozzi and Yi 1988; Hair et al. 2012). However in addition to the composite reliability test, the Cronbach's alpha statistical test was also carried out. The Cronbach's alpha coefficient ranges from 0 to 1. The higher the coefficient the more reliable the scale. Similar to the acceptable measure of composite reliability, Nunnally (1978), suggested that as a rule of thumb, a reliability coefficient value equal to or above 0.7 is statistically acceptable for a study.

3.9.3 Validity Tests

Validity measurement includes external and internal validity. External validity denotes ability of the data to be generalised when in use for dissimilar individuals, situations and periods, while internal validity is the capacity of an instrument to evaluate what it is meant to evaluate (Cooper and Schindler, 2006). Validity is concerned with the precision and relevance of interpretations of research results (Bryman and Cramer, 2005). This study ensured construct validity for the questionnaire by developing it based on prior studies, instruments and a logical conceptual framework. To ascertain face validity, the instrument was given to knowledgeable persons to read, check and suggest modifications.

3.9.4 Convergent Validity Tests

Convergent validity is a measure of the extent to which a construct converges in its indicators. For this the indicator variance is assessed. Fornell and Larcker (1981), posit that convergent validity is computed using the Average Variance Extracted (AVE) of all the indicators related to a construct. The AVE value is the mean of the squared loadings of all the measurement items of a construct. Any AVE computation equal to or higher than 0.50 indicates convergent validity. This implies that the construct contributes to 50% and above of the variance in the indicator (Chin, 2010).

3.9.5 Discriminant Validity

In PLS SEM, discriminant validity measures the degree to which a construct is distinct from the other constructs. For the measurement of discriminant validity, four methods can be used namely the Fornell and Larcker (1981), criterion, inspection of cross-loadings, Heterotrait-monotrait (HTMT) ratio and Heterotrait-monotrait (HTMT) inference. The Fornell and Larcker criterion involves checking whether the square root of the AVE value of a latent construct is greater when compared to its correlation with any other latent

construct. Should this criteria fail to proof discriminant validity, checking of cross loadings is done. This is a less vigorous method to check for validity. In the current study the Fornell and Larcker criterion did not proof discriminant validity. Hence the cross loadings were checked. This method is also referred to as item level discriminant validity (Henseler et al., 2015). Discriminant validity is deemed to exist when an indicators outer loadings on a variable is greater than all its cross loadings with other latent constructs (Hair et al., 2014).

According Henseler et al. (2016), both the Fornell and Larker and Cross-loadings methods, have been found to have some shortcomings in determining whether a measurement model has discriminant validity. Therefore, they recommend that discriminant validity should be analysed through the heterotrait-monotrait ratio of correlations (HTMT) ratio or Heterotrait-monotrait inference ($HTMT_{inference}$) in addition to comparing each construct's AVE with its squared construct correlations. As a result the heterotrait-monotrait (HTMT) ratio and $HTMT_{inference}$ are recommended as alternative measures of discriminant validity. The current study employed all the four measures.

3.9.6 Multicollinearity in the Measurement Model

Multicollinearity occurs where more than two independent constructs are highly correlated. This can cause the estimated regression coefficients to fluctuate widely from sample to sample. According to (Garson, 2016), multicollinearity is not a problem in a reflective measurement model. This is because the latent construct is modelled as a single predictor of the values of individual indicator variables, which are dependent variables. Multicollinearity tests are however necessary for the structural model. In the current model, only the inner model results are relevant and are discussed under the structural model assessment

3.10 Assessing the Structural Model (Inner Model)

Assessing the structural model is the process through which the hypotheses of the study are analysed. This facilitates the researcher to prove or reject the hypothetical propositions of the structural model which represents the conceptual model (Kline, 2011). The assessment of the structural model is only carried out once the measurement model (outer model) has been successfully assessed and found to meet the reliability and validity requirements.

Descriptive statistics were applied to analyse the demographic features of the respondents and the characteristics of the organisations which formed the unit of analysis. This was done using the SPSS version 20. Subsequent analysis involved using SEM and in particular the PLS-SEM analysis. This involved first the assessment of the measurement model and consequently the structural model.

3.10.1 Goodness of Fit for the Structural Model (Inner Model)

There are various assessments used to evaluate the goodness of fit of a structural model. This study assessed for multicollinearity through the Variance Inflation Factor (VIF). Latent path relationships were assessed through path coefficients. The coefficient of determination (R^2) and R^2 change (f^2) effect size were used to evaluate the predictive power of the model. The Stone-Geisser Q^2 value and Q^2 change (q^2) effect size were used to test for predictive relevance of each exogenous construct.

3.10.2 Structural Path Coefficients

Structural path coefficients (loadings) are the path weights connecting one construct to another. Data in PLS SEM are standardized therefore path loadings vary between 0 and 1. The significance of the path loadings is checked through running bootstrapping. The greater the loading the stronger the path in the structural model. A path indicating a non significant loading necessitate respecification of the model without that path. However the researcher may decide to retain the path in aid of the theoretical discussion and also because dropping of any path could affect the significance of the other paths in the model (Garson, 2016).

SEM categorises constructs as either exogenous or endogenous constructs. The differentiation is determined by the orientation of the path denoted by arrows depicting the direction of the relationship. Exogenous constructs have arrows originating from them and none pointing to them. Endogenous construct on the other hand, have arrows pointing to them. In case an endogenous construct also acts as a mediating construct, it will also have an arrow/ or arrows originating from it. On the other hand, the moderation construct is presented with a direct path to the dependent construct of the moderated relationship and in addition, a virtual latent construct is generated to denote the moderation. This virtual exogenous construct is represented as a product of the independent construct and the moderator of the relationships.

3.10.3 The Mediation Test Analysis

Hypothesis 3 of the study presumed organisational learning has a mediating role in the relationship between knowledge management and organisational performance. The evaluation of this mediation role was assessed through the bootstrapping approach recommended by Preacher and Hayes (2004) for mediation tests in PLS-SEM. Mediation analysis can be done through use of either: Baron and Kenny (1986) approach, Sobel (1982) approach or the bootstrap method by Preacher and Hayes (2008). However, for the purpose of PLS-SEM models evaluation, Preacher and Hayes (2008), recommended the bootstrap method.

The bootstrap method which was developed by Preacher and Hayes (2004, 2008), is a non-parametric resampling test. Bootstrapping enables the testing of statistical significance of various PLS-SEM results including path coefficients, cronbach Alpha, R^2 values, and HTMT values among others. Bootstrapping is necessitated by the fact that PLS-SEM does not make the assumption that data is normally distributed. This means that parametric significance as used in regression analyses cannot be applied to assess significance.

The standard error of means is calculated for populations that are assumed to be normally distributed. This is guided by the general principle where one takes repeated samples form a population and calculates the standard deviation of the means of the sample. This gives rise to an estimate of the accuracy of the sample mean as compared to the population mean. However when the data collected does not meet the distribution assumptions, the standard error of mean cannot be used, making it necessary to use the bootstrapping technique. Bootstrapping basically uses the same principle used when calculating the standard error of means. The difference is that instead of sampling from the population distribution, resampling is done from the sample distribution (Hair et al 2014).

In bootstrapping, a big number of subsamples (bootstrap samples) are created with randomly acquired observations from the original set of data with replacement. Replacement signifies that every instance an observation is drawn at random from the sampling population, it is then reverted to the sampling population to be part of the next draw. The subsample is then used for estimation of the PLS path model. This procedure is

done repeatedly until a great number of subsamples derived randomly is created. The default number of these ransom samples for Smart-PLS is 500. The subsample parameter estimations are then applied to obtain standard errors for the estimates. This information is used to calculate t-values to assess each estimates 'significance (Hair et al 2014).

In this technique, the indirect effect is calculated from each sample and a sampling distribution is generated empirically. The main feature of this test is that it is not dependent on the assumption of normal distribution of data, and can therefore be applied on small samples (Hair et al., 2014; Pardo and Roman, 2013). According to Bollen and Stine, (1990) and Shrout and Bolger, (2002), bootstrapping has become very popular as a method for testing the mediation effect.

When testing for mediation bootstrapping is applied twice: first while excluding the mediator and therefore testing the direct relationship between the exogenous and endogenous constructs, after which it's done again with the presence of the mediator (intervening construct) which gives rise to total effect results. According to Wong, (2015), and Hair et al., (2014), when a direct path relationship is not significant, mediation is impossible. If the direct path relationship is statistically significant, the mediating construct is included and the bootstrapping procedure is run again. When an indirect path is statistically insignificant after bootstrapping, there is no mediation. If on the other hand it is found to be significant, it indicates presence of mediation. Having found a mediation effect, the magnitude of mediation is calculated through the variance accounted for (VAF). According to Hair et al. (2014), when a VAF value is more than 80% there is full mediation. On the other hand a value between 20% and 80% indicates partial mediation, and a value less than 20% means there is no mediation.

CHAPTER FOUR
ANALYSIS, RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

Chapter Four is a presentation and discussion of the results of the statistical analyses of the extant study data. In this study, the SmartPLS 3.2.1 software tool was applied to conduct PLS-SEM analysis on data collected in the survey. This chapter presents the results of the study as follows: the response rate of the survey, the demographic characteristics of the respondents and some descriptive statistics on the company profiles. Included in this chapter is the discussion on data preparation. The examination of first the measurement model and the structural model are the most crucial parts of this chapter. Tests of the measurement model include reliability and validity test. The structural model is then examined to assess the hypotheses. The study findings were then interpreted in relation to the study objectives.

4.2 Response Rate

The population of the study entailed of all the organisations that were listed on the NSE as at the end of 2015. There were 61 companies listed as at 2015. In the course of the study the researcher found that one company (ReaVipingo Ltd) had been delisted and Hutchings Biemer had been suspended.

The total number of companies surveyed thus reduced to 59. Out of these, 46 respondents returned their filled responses, translating to a response rate of 78%. However only 43 out of these were usable, translating to 73%. This response rate was good based on the fact that Baruch and Holtom (2008) concluded that a 35% response rate is adequate for a cross sectional survey. Similarly Kindombo (2007) had a response rate of 64%, Busienei (2013), 69.4, Kyongo (2016) 53.1%.

4.3 Data Preparation and Coding

The raw data collected was subjected to a thorough examination for completeness, consistency and accuracy. In this 3 questionnaires out of the 46 responses were found to be unusable. Of these 1 questionnaire was rejected because another had already been collected from the company, another had over 25% of missing data. The third response was

rejected because over 90% of all the response choice on the 5 point likert scale indicate answer choice 5, rendering the response to be inaccurate. A few responses were found to have missing data on one or two questions. Missing data may have been caused by data entry errors, or failure of respondent to answer a question or questions. These were usable but the missing responses were replaced with the series mean using the SPSS program as per the recommendation by (Hair et al., 2013).

The study consists of four constructs. Each of the constructs has many indicators. Part two of the questionnaire, which was a likert type scale, was organised and coded using the SPSS tool. Further examination of the questions in comparison with the coded items revealed that four of the questions had been framed in a reverse way and therefore had to be reverse coded. An SPSS application version 20 was used for primary analysis of data. Construct titles and labels in SPSS were matched with those in the questionnaire so as to prevent errors in data entry. This data was then imported into the SmartPLS software for further analysis.

4.4 Demographic Analysis

Demographic analysis in the extant research comprises of description of the distribution of the respondents by job title, work experience in current organisation, response rate in terms of the industry the organisation operates in, the size of the organisation and financial performance in terms of Return on Assets.

4.4.1 Distribution of Respondent by Job Title

The target respondents of the current study were managers in the organisations. Most of the respondents turned out to be Human resource managers, General Managers and ICT managers. The respondents were required to indicate their job titles. The job profiles of the respondents is presented in Table 4.1.

Table 4.1: Respondents Job Title

Job Title	Frequency	Percent
Human Resource Manager	10	23
General Manager	10	23
ICT Manager	8	19
Business Administration Manager	6	14
Operations Manager	3	7
Finance Manager	3	7
Marketing Manager	2	5
Manager Engineering	1	2
Totals	43	100

Source: Primary data

4.4.2 Distribution of Respondent by Experience

The respondents had to indicate how long they had worked in their current organisation. The responses were grouped into seven major groupings by years of experience as follows; (0 – 10), (11-15), (21-25) (26-30) and (over 30) years. The responses are presented in Table 4.2 below. Over 70 % of the respondents had stayed in their present organisation for 10 years and below. This indicated that there was high turnover in the organisations listed in the NSE and that most managerial positions were filled from without the organisations. This is likely to be the case because most managers could not have risen to the managerial positions within the organisations in only ten years and below.

Table 4.2: Experience of respondent in Current Organisation

Years	Frequency	Percentages
0 – 10	31	72
11 – 15	5	12
16 – 20	1	2
21 – 25	4	9
26 – 30	2	5
Over 30	0	0
Totals	43	100

Source: Primary data (2018)

4.4.3 Response Rate by Industry

In the NSE, organisations are classified according to industry. Most of the respondents were from the banking sector which achieved 23% of all the responses. This was followed by commercial services which achieved 19 % of the responses. The insurance sector achieved 14%, industrial and allied 12%, motor vehicles and fittings, 7%, agricultural 7% and growth enterprise marketing segment 2%. This information is presented in Table 4.3.

Table 4.3: Response Rate by Industry

Industry	Frequency	Percentage
Agriculture	3	7
Vehicles and Fittings	3	7
Financial services	10	23
Commercial Services	8	19
building and Allied	2	5
Energy and Petroleum	4	9
Insurance	6	14
Investments	1	2
Industrial	5	12
Telecommunications and Technology	0	0
Growth enterprise Market	1	2
Totals	43	100

Source: Primary data (2018)

4.4.4 The Size of the Organisation

Respondents were asked to answer a question on the number of employees in their organisation. This was aimed at assisting in the determination of the size of the organisation. Employee numbers is a crucial the indicator of the size of a company. The different responses were categorized as follows; (0 – 49) employees, (50 - 499), (1000 – 1499), (1500 – 1999) and (2000 plus). 35% of the companies had between 50 and 499 employees, 19% had between 500 and 999 employees, 19% had over 2000 employees, 16% had between 1000 and 1499 employees, 9% had below 50 employees and only 2 5 had between 1500 and 1999 employees. This information is presented in Table 4.4 below. According to OECD (2005), any organisation with less than 250 employees is a small and Micro enterprise. While organisations with 250 and above are considered to be large (Ambula 2015). In view of this, the majority of the organisations listed on the NSE are large.

Table 4.4: Size of the Organisation

Number of employees	Frequency	Percentage
1 -49	4	9
50- 499	15	35
500 – 999	8	19
1000 – 1499	7	16
1500 – 1999	1	2
2000 plus	8	19
Total	43	100

Source: Primary data (2018)

4.4.5 Frequency of Training

This section was aimed at assessing how often the different organisations carried out training of their employees. The frequency of training was classified into; weekly, monthly, quarterly, after six months, once a year and on needs basis. The responses indicated that 54% of the organisations trained as need arose, 7 % trained on a monthly basis, 5% on weekly basis, 4% trained quarterly, 3% trained once in six months and 1 % trained once in a year. From this summary, the conclusion is that most organisations in the NSE trained their employees when need arose. This indicated an absence of structured training plans in a majority of the organisations. This could imply that the organisations listed at the NSE, are not very strong on training. This is presented in Table 4.5.

Table 4.5: Distribution of Respondents by Frequency of Training

	Frequency	Percentage
Weekly	5	12
Monthly	7	16
Quarterly	4	9
After six months	3	7
Once a year	1	2
On needs basis	23	54
Total	43	100

Source: Primary data (2018)

4.4.6 Financial Performance (Return on Assets)

This section gives the descriptive reports on secondary data detailing the Return on Assets (ROA). ROA reports were accessed for 40 companies. A summary of the reports indicated that 17.5% of the companies reported a negative ROA percentage. 37.5% of the companies reported between 0.1% and 5% ROA, while 17.5% of the companies reported between >5% and 10% of ROA, 12.5% reported between >10 % and 15% reported ROA of above 15%. This indicates that over 80% of the companies reported a positive return on assets with only 19% reporting a negative return on assets.

According to Investopedia (2017), as a rule of thumb, a ROA of 5% is good. However it differs according to industry. For banks a ROA of 1.5% and above is good. In the farming industry (Kohl, 2009) holds that a ROA of less than 1% is weak, one of between 1-5% is stable while any ROA above 5% is considered to be strong. In view of this, it is notable that for companies listed on the NSE only 17.5% reported a ROA of less than 1%, 82.5% achieved a ROA of 1% and above. Out of these, 45% reported a ROA of above 5%, which indicates a strong performance. It is worth noting that 15% of these companies achieved a very strong ROA of above 15%. A summary of the ROA report in the NSE is presented in the Table 4.6.

Table 4.6 Financial Performance (ROA)

Percentage return on assets	**Number of companies**	**Percent of companies**
1. -%	7	17.5
2. 0 - 5%	15	37.5
3. >5. – 10%	7	17.5
4. >10. -15%	5	12.5
5. Above 15%	6	15
Totals	40	100

Source: Primary data (2018)

4.5 Reflective Measurement Model (outer model) Assessment

The outer model consists of the indicators and the paths linking them to the associated constructs (Garson, 2016). The outer loadings signify the total contribution of the measurement item to the definition of its latent construct.

4.5.1 Indicator Loadings and Indicator Reliability

In a reflective model, a researcher starts by examining the indicator loadings which is similar to factor analysis. Indicator loadings are also known as outer model loadings or measurement loadings. These are considered to be a type of indicator reliability coefficients for reflective models (Garson, 2016). Data is standardized automatically in SmartPLS, hence the loadings vary from 0 to 1. The closer to 1, the loadings are the more reliable the indicator is. Indicator loadings of 0.7 signify that a construct explains about 50% of the indicator's variance (Henseler et al., 2012). As a rule of thumb an indicator with a loading below 0.7 should be dropped to improve composite reliability (Hair et al., 2014). Any indicator with loadings of less than 0.7 is dropped one at a time and the analysis run each time an indicator is dropped until only those with loadings of 0.7 and above remain. The analysis is done each time because every time an indicator is dropped the loadings of all the other indicators of the construct change.

In this study the construct knowledge management originally had 16 indicators, 7 indicators were dropped leaving only 9 indicators which achieved loadings of 0.7 and above. The construct 'organisational learning' originally had 18 indicators. 2 were dropped leaving 16. The construct organisational characteristics had 24 indicators of which a total of 14 indicators were dropped leaving 10. The dependent construct of organisational performance had 18 indicators, 3 were dropped leaving 15. This has been presented in the table at Appendix 3 a). Figure 4.1a) presents the original SmartPLS structural equation model before dropping the indicators with loadings below 0.7. Figure 4.1b) presents the respecified SmartPLS structural equation model after dropping the indicators with loadings below 0.7. Figure 4.1c) presents the respecified conceptual model and Figure 4.1d) presents the study's respecified structural equation model.

Indicator Reliability

Indicator reliability is the square of the indicator loading. The indicator loadings ought to be significant and the bigger the loading value the more reliable the measurement model. Thus an indicator loading of 0.708 results into indicator reliability of 50%. This means that it is the level at which the construct explains approximately 50% of the variance in the indicator. At this point the explained variance is greater than variance caused by error (Hair et al., 2014, Ringle et al., 2016).

Indicator reliability is obtained by dropping any indicators with loadings below the threshold of 0.7 as has been done above. The indicator loadings of the original model are presented in Appendix IVa. In the current study this was achieved where all indicators with a value of less than 0.7 were dropped one at a time and recalculation done each time. This was necessary because the drop of a respective indicator affected all the other indicator values associated with a specific construct. Finally only those indicators with values of 0.7 and above were left in the model. The respecified model thus has indicator reliability as presented in Appendix IVb)

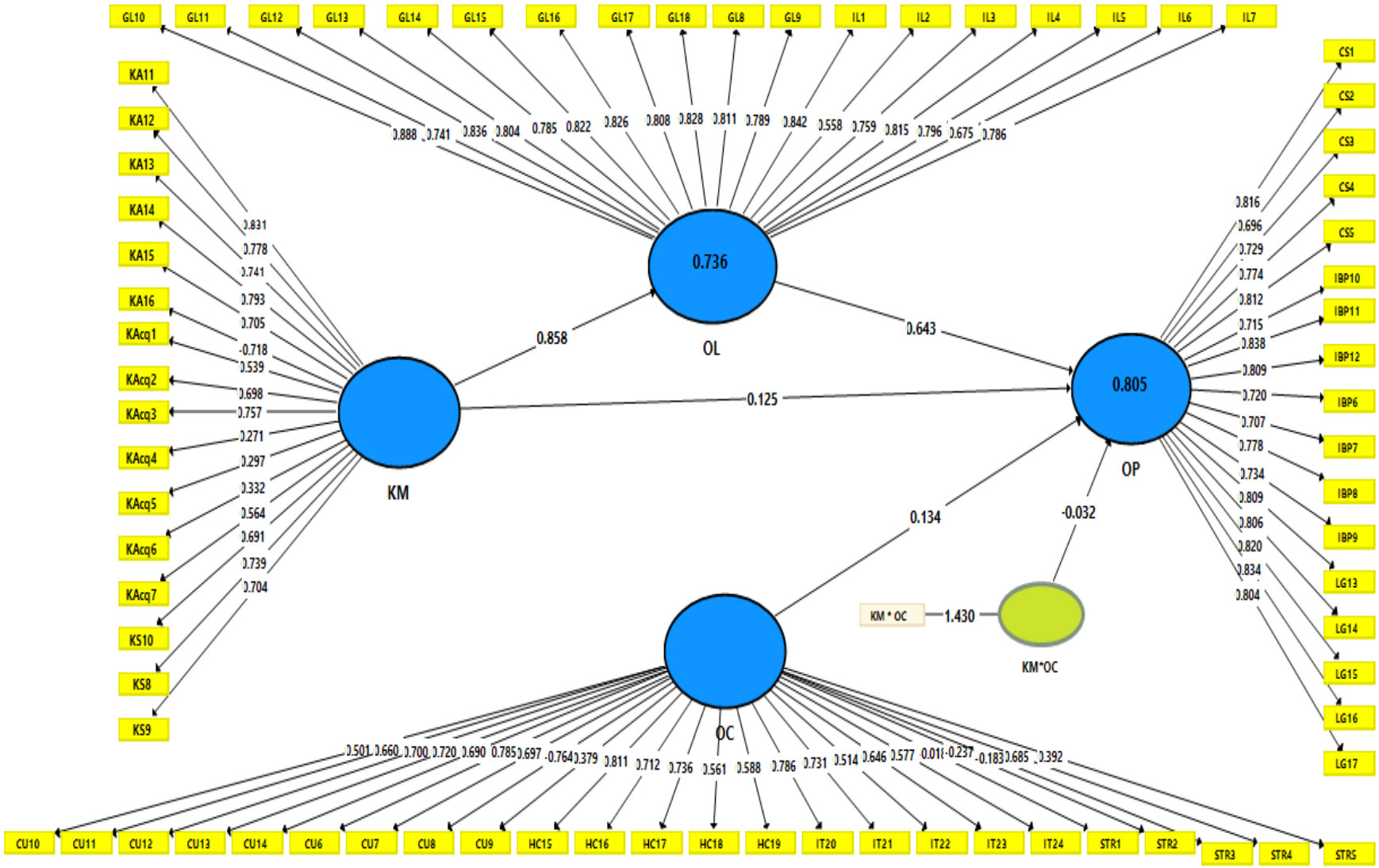


Figure 4.1a: Original Model with all the indicators
Source: Primary data (2018).

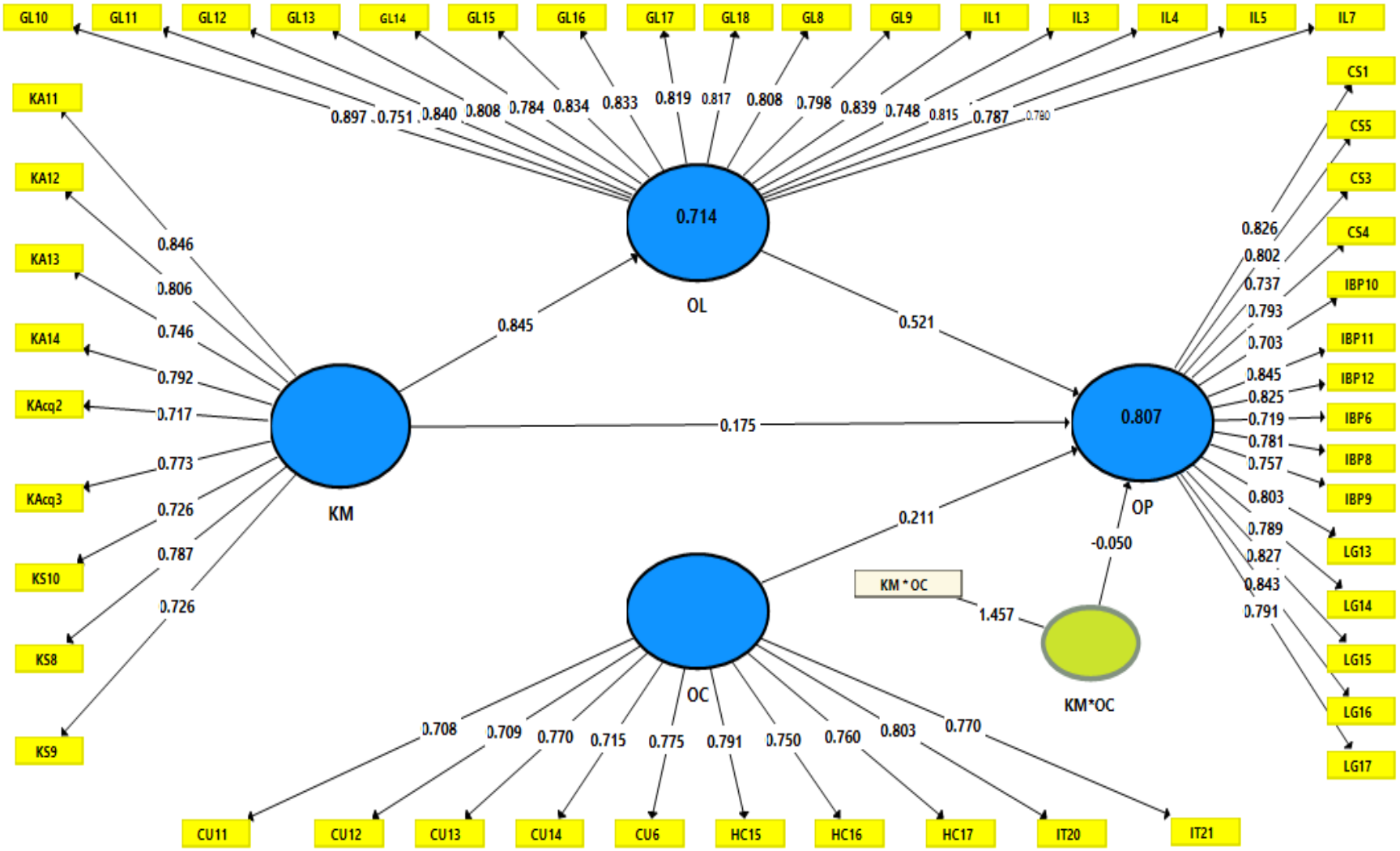


Figure 4.1b: Final Respecified Model

Source: Primary data (2018)

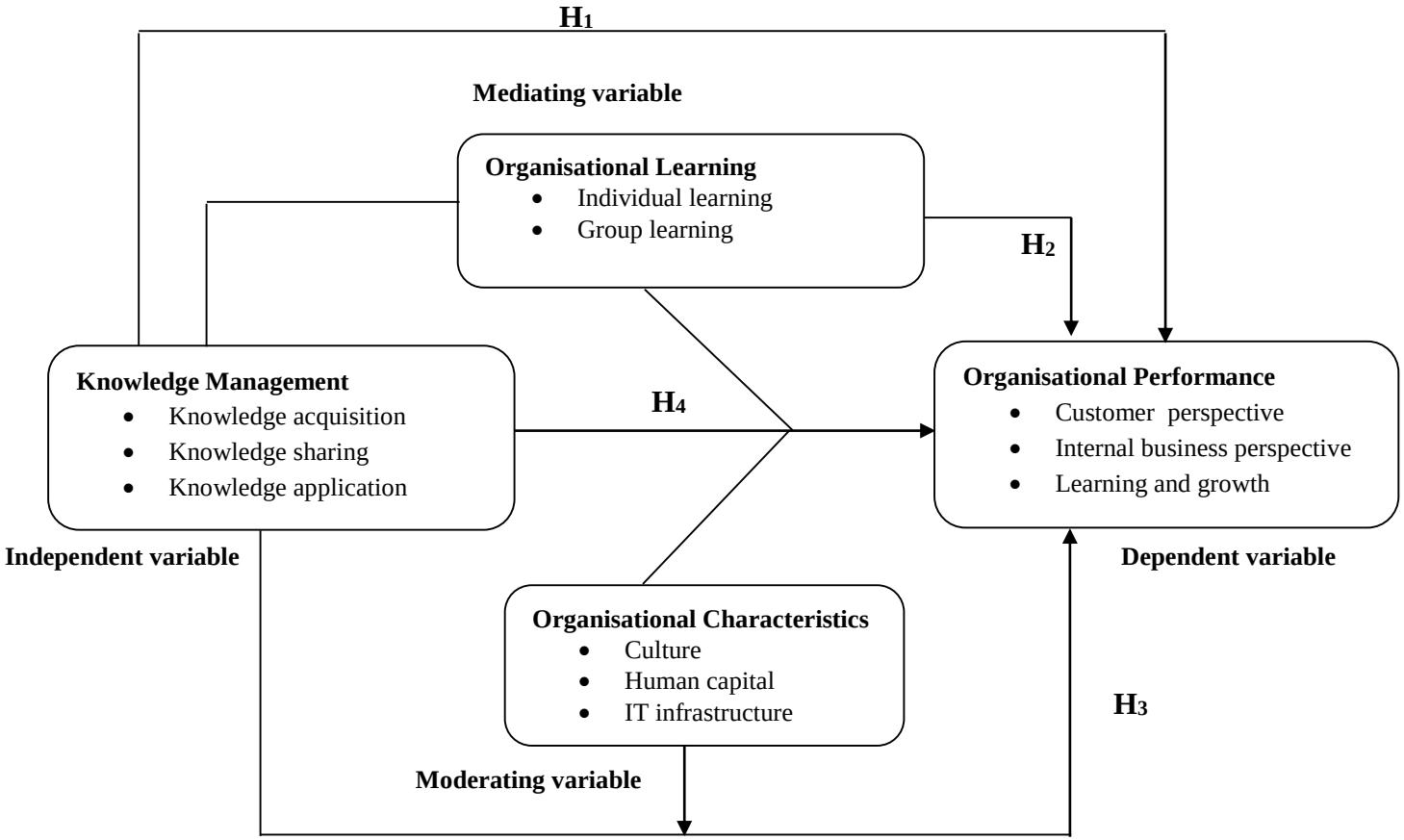


Figure 4.1c: Respecified Conceptual Model
Source: Current Researcher (2018)

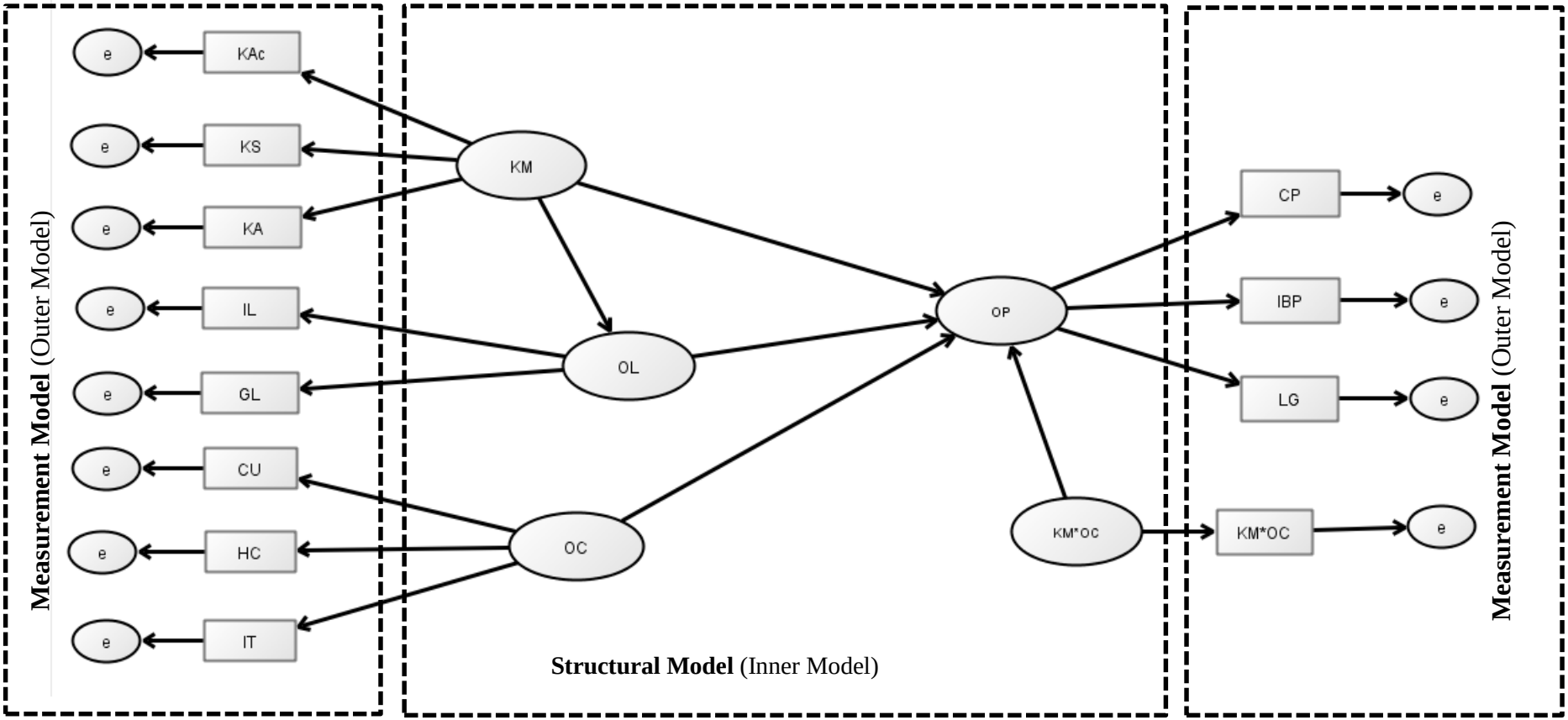


Figure 4.1d): Respecified Structural Equation Model

KEY: KAc knowledge acquisition; **KS** knowledge sharing; **KA** knowledge application; **IL** individual learning; **GL** group learning; **CU** culture; **HC** human capital; **IT** information technology infrastructure; **CP** customer perspective; **IBP** Internal business process; **LG** learning and growth; **KM**; knowledge management; **OL**, Organisational learning (mediating construct), **OC**, organisational characteristics (moderating construct) ; **OP** Organisational Performance

Source: Current Researcher (2018)

4.5.2 Construct Internal Consistency Reliability

Internal consistency reliability in social science research was traditionally measured using the Cronbach alpha coefficient. In PLS-SEM, this is measured by the use of composite reliability because the Cronbach alpha coefficient has been reported to result into a conservative measurement. Scholars have consequently recommended the use of composite reliability which is less conservative (Bagozzi and Yi 1988; Hair et al., 2012). Composite reliability as a test for reliability which was introduced by Joreskog in (1971). Higher levels of composite reliability indicate higher levels of constructs internal consistency. According to Bagozzi and Yi (1988), and Hair et al. (2012), composite reliability values of 0.7 or more are acceptable.

Results of composite reliability in the current study were as follows: knowledge management construct 0.929, organisational characteristics; 0.939, organisational learning; 0.968, organisational performance; 0.961. These exceeded the minimum requirement of a level of 0.7. This indicates high levels of internal consistency reliability for all the four constructs in the model. In comparison the Cronbach alpha results for knowledge management are 0.914, organisational characteristics; 0.916, organisational learning; 0.965 and organisational performance 0.957. These results are very close to those from the composite reliability tests and indicate high levels of internal consistency reliability. This is presented in Table 4.7.

Table 4.7: Construct Internal Consistency Reliability

	Cronbach's Alpha	Composite Reliability
Knowledge management	0.914	0.929
Organisational characteristics	0.916	0.930
Organisational learning	0.965	0.968
Organisational performance	0.957	0.961

Source: Primary Data (2018)

4.5.3 Convergent Validity

Convergent validity evaluates the level to which a construct converges in its indicators by explaining the indicators variance. Fornell and Larcker (1981), direct that convergent validity is determined by calculating the AVE for all indicators related to each construct. The AVE value is the mean of the squared loadings of all the indicators of a construct. An acceptable AVE value should be equal to or greater than 0.50. This implies that 50% or more of the indicators variance can be explained (Chin, 2010).

Table 4.8 presents the AVE values for the extant study. The Fornell and Larcker (1981), criterion established that all the AVE values for the respecified reflective constructs were higher than the squared interconstruct correlations. All constructs have AVE value ranging from 0.571 to 0.657, which exceeds the endorsed threshold value of 0.5. In conclusion therefore, the respecified measurement model has satisfactory convergent validity.

Table 4.8: Average Variance Extracted (AVE)

	Average Variance Extracted (AVE)
Knowledge management	0.593
Organisational characteristics	0.571
Organisational learning	0.657
Organisational performance	0.625

Source: Current Researcher (2018)

4.5.4 Discriminant Validity

Discriminant validity assesses the level to which an individual construct is empirically dissimilar from the other constructs. This measure is necessary so as to guarantee that a reflective construct has stronger relationships with its own indicators when compared with its relationship with the indicators of other constructs in the SEM model (Hair et al 2014). For this analysis, the Fornell and Larcker (1981) criterion, inspection of cross-loadings, heterotrait-monotrait (HTMT) ratio and heterotrait-monotrait inference ($HTMT_{inference}$) inference were used.

This criterion compares each constructs AVE value with the squared interconstruct correlation of that construct with all the other constructs in the structural model. For any latent construct, the square root of the AVE value ought to be higher than its correlation with any other latent construct. Consequently for any latent construct, the variance shared with its block indicators ought to be greater than the variance it shares with any other latent construct.

In the SmartPLS output the square root of AVE is shown in the diagonal cells while the correlations appear below it. In this study the Fornell and Larcker criterion did not indicate discriminant validity as some of the cross loading figures were greater than the square root of the AVE value of the latent constructs. This is presented in table 4.9a. Hence the cross loading criterion, an alternative to test for discriminant validity was applied to further establish the status of discriminant validity.

Table 4.9a: The Fornell and Larcker Criterion Results

	Knowledge management	Organisational characteristics	Organisational learning	Organisational performance
Knowledge management (KM)	0.770			
Organisational characteristics (OC)	0.685	0.756		
Organisational learning (OL)	0.845	0.817	0.811	
Organisational performance (OP)	0.794	0.801	0.880	0.791

Source: Primary data (2018)

Checking of cross loadings is a less vigorous method of establishing discriminant validity also referred to as "item level discriminant validity" (Henseler et al., 2015). Gefen and Straub (2005), found that discriminant validity is present, when an individual manifest construct has a weak correlation with all other constructs apart from the one it is associated with. An indicators loadings on a construct ought to be greater than all its cross loadings with other latent constructs (Hair et al., 2014). In the extant research paper, all the indicator loadings were higher than all their cross loadings as presented in Table 4.9b. This implied that the model meets the requirements of discriminant validity.

Table 4.9b: Cross-loadings

Cross Loadings				
	KM	**OC**	**OL**	**OP**
CS1	0.710	0.833	0.760	**0.826**
CS3	0.528	0.483	0.541	**0.737**
CS4	0.622	0.607	0.641	**0.793**
CS5	0.625	0.636	0.707	**0.802**
IBP6	0.598	0.479	0.618	**0.719**
IBP8	0.596	0.517	0.604	**0.781**
IBP9	0.538	0.691	0.683	**0.757**
IBP10	0.524	0.538	0.690	**0.703**
IBP11	0.551	0.673	0.759	**0.845**
IBP12	0.541	0.635	0.647	**0.825**
LG13	0.698	0.698	0.792	**0.803**
LG14	0.677	0.573	0.653	**0.789**
LG15	0.752	0.683	0.730	**0.827**
LG16	0.638	0.710	0.711	**0.843**
LG17	0.753	0.633	0.810	**0.791**
GL8	0.596	0.561	**0.808**	0.711
GL9	0.599	0.621	**0.798**	0.663
GL10	0.754	0.679	**0.897**	0.671
GL11	0.619	0.670	**0.751**	0.745
GL12	0.725	0.671	**0.840**	0.807
GL13	0.670	0.620	**0.808**	0.677
GL14	0.641	0.661	**0.784**	0.775
GL15	0.634	0.691	**0.834**	0.705
GL16	0.698	0.756	**0.833**	0.788
GL17	0.659	0.626	**0.819**	0.644
GL18	0.751	0.561	**0.817**	0.737
IL1	0.725	0.796	**0.839**	0.727
IL3	0.725	0.632	**0.748**	0.657

Cross Loadings				
	KM	**OC**	**OL**	**OP**
IL4	0.784	0.649	**0.815**	0.728
IL5	0.650	0.697	**0.787**	0.668
IL7	0.694	0.689	**0.780**	0.676
CU6	0.690	**0.775**	0.670	0.664
CU11	0.517	**0.708**	0.605	0.509
CU12	0.606	**0.709**	0.695	0.551
CU13	0.616	**0.770**	0.567	0.537
CU14	0.516	**0.715**	0.676	0.653
HC15	0.434	**0.791**	0.654	0.646
HC16	0.404	**0.750**	0.506	0.564
HC17	0.496	**0.760**	0.572	0.648
IT20	0.497	**0.803**	0.619	0.612
IT21	0.408	**0.770**	0.598	0.626
KAcq2	**0.717**	0.530	0.591	0.589
KAcq3	**0.773**	0.606	0.613	0.586
KS8	**0.787**	0.498	0.628	0.563
KS9	**0.726**	0.477	0.613	0.550
KS10	**0.726**	0.454	0.592	0.576
KA11	**0.846**	0.625	0.719	0.751
KA12	**0.806**	0.515	0.708	0.686
KA13	**0.746**	0.503	0.668	0.562
KA14	**0.792**	0.523	0.705	0.609

Source: Primary data (2018)

The Fornell- Larcker criterion and cross loadings techniques are considered to have some shortcomings when used for the establishment of the presence or absence of discriminant validity. According to Henseler et al. (2015), both methods often lead scholars to mistakenly conclude that discriminant validity had been proven. They found that both were inadequate to detect discriminant validity. They therefore recommend that discriminant validity is best measured through the heterotrait-monotrait (HTMT) ratio.

The $HTMT_{ratio}$ is the mean of the heterotrait-heteromethod correlations. These are the correlations of the indicators across constructs assessing varying phenomena, as compared to the mean of the monotrait-heteromethod correlations (the correlations of indicators within the same construct). In a good model, the heterotrait correlations should be less than the monotrait correlations translating to a HTMT ratio of below 1.0 (Henseler et al.

2015, Teo et al. 2008). Gold et al. (2001), further agree that if the HTMT ratio measures below 0.9 ($HTMT_{.90}$), this establishes discriminant validity between a given pair of reflective latent constructs. In the current study all the pairs of latent constructs were found to have discriminant validity apart from the pair of organisational learning and organisational performance. This is presented in Table 4.9c.

Table 4.9c: Heterotrait Monotrait Ratio

Heterotrait-Monotrait Ratio (HTMT)				
	KM	**OC**	**OL**	**OP**
KM				
OC	**0.749**			
OL	0.896	0.867		
OP	**0.840**	**0.841**	**0.907**	

Source: Primary data (2018)

According to Henseler et al. (2015), the HTMT can also be a basis for a statistical discriminant validity test known as $HTMT_{inference}$. This is a bootstrapping technique which facilitates construction of confidence intervals for the HTMT. A confidence interval with a value of 1 indicates that there is no discriminant validity while a value of less than 1 indicates discriminant validity. In the current study, the bootstrapped $HTMT_{inference}$ values were all less than 1 therefore indicating that discriminant validity had been established. This is presented in Table 4.9d.

Table 4.9 d: Heterotrait Monotrait Ratio and Heterotrait Monotrait Inference

	Original HTMT Ratio	**Bootstrapped HTMT Inference**
OC -> KM	0.749	0.762
OL -> KM	0.896	0.888
OL -> OC	0.867	0.872
OP -> KM	0.840	0.826
OP -> OC	0.841	0.838
OP -> OL	0.907	0.899

Source: Primary data (2018)

4.5.5 Multicollinearity in the Measurement Model

Collinearity arises when two indicators are highly correlated. When more than two indicators are involved, it is called multicollinearity. In OLS regression, there will be multicollinearity when two or more independent variables are highly intercorrelated. Multicollinearity in OLS regression is caused by inflation of standard errors, leading unreliability in the statistical significance of independent variables. This hinders the researcher from evaluating the relative significance of one independent variable as compared to another. The common rule of thumb implies that multicollinearity problem may occur if the variance inflation factor (VIF) coefficient is higher than 4.0 or 5.0 (Garson, 2016).

According to Garson (2016), multicollinearity is not an issue in a reflective measurement model. This is because the latent construct is modelled as a sole predictor of the values of individual measurement items, which are dependent items. SmartPLS however gives VIF statistics for both the measurement model and the structural model regardless of whether it is reflective or formative. In the current model, only the structural model results are relevant and are discussed in the consequent section on structural model assessment.

4.6 Assessment of the Structural Model (Inner Model)

The second phase of PLS SEM assessment involves examination of the structural model. This is only carried out once the measurement model assessment has been completed and the model found to be plausible. If the measurement model does not satisfy the requirements of acceptable reliability and validity, then the structural model estimates are not useful (Henseler, Hubona and Ray, 2016). Endorsing the structural model aids the researcher to methodically evaluate the plausibility of the hypotheses in the structural model. (Garson, 2016). The extant measurement model was found to satisfy the validity and reliability requirements.

The structural model comprises the constructs knowledge management, organisational learning, organisational characteristics and organisational performance. Knowledge management is a composite index of knowledge acquisition, knowledge sharing and knowledge application. Organisational learning is a composite index of individual learning and group learning. Organisational characteristics is a composite index of culture, human capital and IT infrastructure.

4.6.1 Goodness of Fit for the Structural Model

Evaluation of the structural models quality depends on its capacity to predict the endogenous constructs. The PLS-SEM model is presumed to have the correct specifications and is therefore tested based on how well it predicts the endogenous constructs. This is done through testing the statistical significance of the path coefficients and measurement of the coefficients of determination (R^2), also known as the predictive power of the exogenous constructs. This is done simultaneously with the evaluation of the R^2 change (f^2 effect size). Another key step is the evaluation of the predictive relevance also referred to as Cross-validated redundancy (Q^2). This is done together with the Q^2 change (q^2 effect size). q^2 effect size measures how important an exogenous construct is in the overall predictive relevance of the model (Garson, 2016). Before this can be done, analysis has to be carried out to test for potential multicolliniearity between the constructs.

4.6.1.1 Multicollinearity in the Structural Model

All PLS- SEM models have a potential of multicollinearity in the structural model regardless of whether they are formative or reflective. Therefore the structural model has to be tested for potential multicollinearity amongst the predictor constructs before further evaluation of the structural model. In PLS SEM the level of multicollinearity is indicated by the VIF coefficients. A well-fitting model without multicollinearity should have VIF coefficients of less than 5.0 (Sarstedt et al. 2014). The VIF values resulting from this study are shown in Table 4.10. All the VIF values for the predictor constructs were below 5 with the exception of the relationship between organisational learning and organisational performance.

According to Kenny and Baron (1986), multicollinearity is anticipated in a mediational relationship and is unavoidable. When a mediator is strong there will be more multicollinearity, when a mediator is weaker the multicollinearity will also be weak. In the current model collinearity is recorded between the mediator construct “organisational learning” and the endogenous construct “organisational performance” In this case the VIF value is 5.592. This is because organisational learning may have a mediation role in the relationship between knowledge management and organisational performance. All the other VIF values are below 5.0 indicating the absence of multicollinearity.

Table 4.10: Collinearity Statistics (VIF)

	KM	Moderating Effect 1	OC	OL	OP
Knowledge management (KM)				1.000	3.518
Moderating Effect 1 (of organisational characteristics on the relationship between knowledge management and organisational performance).					1.628
Organisational characteristics (OC)					3.476
Organisational learning (OL)					5.593
Organisational performance (OP)					

Source: Primary data (2018)

4.6.2 Predictive Power (R^2) and (f^2) Effect Size

This step consists of a review of the coefficient of determination also referred to as the R^2 value of each endogenous construct. The R^2 value is a computation of a models predictive power. It's a measurement of the explained variance in the individual exogenous constructs (Sarstedt et al., 2014). The R^2 value ranges between 0 and 1, the greater the number, the greater its predictive power. According to Garson (2016), an R^2 value of 0.67 indicates substantial predictive power, while 0.33 is moderate and 0.25 weak.

This study has two endogenous latent variables. These are organisational learning and organisational performance. The predictive power of organisational learning gave rise to the following results; R^2=0.714, t=8.462, P < 0.05 at the significant level of (t =1.96, P<0.05), while organisational performance resulted in R^2 =0.807, t=13.228 and P < 0.05 at the significance level of (t =1.96, P<0.05). This means that 71.4 % (0.714) of the variance in organisational learning and 80.7% (0.807) of the variance in organisational performance respectively is explained by the model and that both are statistically significant. In view of the guidelines by Garson (2016), and Hair et al (2013), R^2 value of 0.67 and above is regarded as substantial, a value of 0.33 is moderate and a value of 0.19 is taken to be weak. Based on these recommendations, the predictive power of the model for both organisational learning (0.714) and organisational performance (0.807) were substantial. Table 4.11 presents the R^2 (predictive power) results.

Apart from assessing the R^2 computations of all endogenous constructs, it's also important to evaluate the R^2 change (f^2 effect size. R^2 change (f^2) is used to measure the magnitude

of the impact on R^2 value as a result of the omission of one exogenous construct. This computation is known as the f^2 effect size. f^2 value of 0.02 denotes a small effect size, 0.15 represent a medium effect size, while 0.35 denotes a large effect size (Cohen, 1988). In the current study, the f^2 values due to the omission of knowledge management, organisational learning and organisational characteristics respectively were 0.045, 0.252 and 0.066 respectively. This implies that knowledge management and organisational characteristics respectively, have a small effect size on predictive power, whereas organisational learning has a medium effect size. Therefore the construct with the most predictive power in the current study is organisational learning. The results on predictive power are presented in table 4.11.

Table 4.11: Predictive Power R^2

	R^2	**f^2 effect size (R^2 change)**	**T Statistics (|O/STDEV|)**	**P Values**
OL	0.714		8.462	0.000
OP	0.807		13.228	0.000
OP: Omission of KM	0.798	0.045	-	
Omission of OL	0.761	0.252	-	
Omission of OC	0.784	0.066	-	

Key: OL- Organisational learning, OP- Organisational Performance,
KM- Knowledge Management, OC- Organisational Characteristics
Source: Primary data (2018)

4.6.3 Predictive Relevance (Q^2) and (q^2) effect size

The study's PLS-SEM model has two endogenous construct, namely organisational learning and organisational performance. Predictive relevance was tested using the Stone-Geisser test (Q^2) or the construct cross-validated redundancy test (Geisser 1975). Predictive relevance evaluates the degree to which the models endogenous constructs can be reflected by the related exogenous constructs. In a structural model a Q^2 value that is greater than 0, reveals that the path model has predictive relevance for that specific endogenous construct (Chin 1998 and Ruiz et al. 2009). A Q^2 value with a zero or negative

output indicates that the model is irrelevant. A 0.02 value of Q^2 represents a small predictive relevance, a value of 0.15 represents a medium predictive relevance while 0.35 and above indicates a high predictive relevance. The current study gave rise to a Q^2 value of 0.402 for organisational learning and 0.417 for organisational performance. In conclusion, the model indicates a relatively high degree of predictive relevance in regards to both the endogenous constructs of organisational learning and organisational performance.

The Q^2 Change is also referred to as the q^2 effect size. This is an alternative statistic that is used to measure the relative predictive relevance of a specified exogenous construct to the endogenous construct. The q^2 value compares Q^2 predictive relevance values for models when a certain exogenous construct has been left out of the model. Therefore the q^2 effect size enables the relative predictive relevance of each respective exogenous construct to be assessed (Garson, 2016). The q^2 values > 0.15 is a weak effect, 0.15 ≥ 0.35 is moderate, while ≥ 0.35 respectively, indicates that the exogenous construct has a strong predictive relevance for the particular endogenous construct. In the current model the q^2 values for knowledge management, and organisational characteristics respectively are 0.007, 0.039 and 0.021. It is important to point out that the q^2 value for the moderating effect was almost non-existent at 0.003. This implies that when any of the three exogenous constructs in the model is omitted from the model, the effect size on organisational performance is small. Organisational learning had the biggest q^2 effect size value at 0.039 indicating that omission of organisational learning would have a larger effect on the predictive relevance of the current model than the other two exogenous constructs. The test results of Q^2 and q^2 are presented in Table 4.12.

Table 4.12 Predictive Power and Predictive Relevance

Latent variable	R^2	R^2 Change: (f^2)	Q^2	Q^2 change (q^2)
KM,OL,OC, OP	OP= 0.807		0.417	
	OL=0.714		0.402	
Omission of KM	0.798	0.045	0.413	0.007
Omission of OC	0.784	0.066	0.405	0.021
Omission of OL	0.761	0.252	0.394	0.039
KM, OL, OC and OP (omission of the moderating effect)	0.804	0.014		0.003
KM and OL	0.714	-	0.402	-
OC and OP	0.649	-	0.338	-
KM and OP	0.641	-	0.323	-

Key; OL- Organisational learning, OP- Organisational Performance,
KM- Knowledge Management, OC- Organisational Characteristics,
SSO –Sum of squared observations; SSE- sum of squared predictive errors
Source: Primary data (2018)

4.7 Hypothesis Testing

The study's PLS SEM structural model was assessed using the path coefficients also known as path weights. In the current structural model, every path which connects two constructs represents a hypothesis. According to Henseler et al. (2016) the path coefficients are essentially standardized regression coefficients, which can be evaluated based on their sign and absolute size. They indicate the change in the endogenous construct if the exogenous construct changes by one unit while all the other exogenous constructs remain constant. The path coefficient enable's one to ratify or reject any hypothesis, while also facilitating comprehension of the power of the relationship amongst exogenous and endogenous constructs.

In view of the recommendation by Chin (1998), the current study applied bootstrapping with 500 resamples to calculate t statistics and P values. This facilitated the evaluation of the statistical significance of the path coefficients. To assess the change effect of R^2 and Q^2 values on the exogenous constructs in the structural model, the f^2 and q^2 effect size were determined. The path coefficients were tested at the significance level of ($t > 1.96$, $P \leq 0.05$). Figure 4.2a, presents the structural regression model with t statistics, 4.2b presents structural regression model with p values and 4.2c presents the path coefficients and indicator loadings.

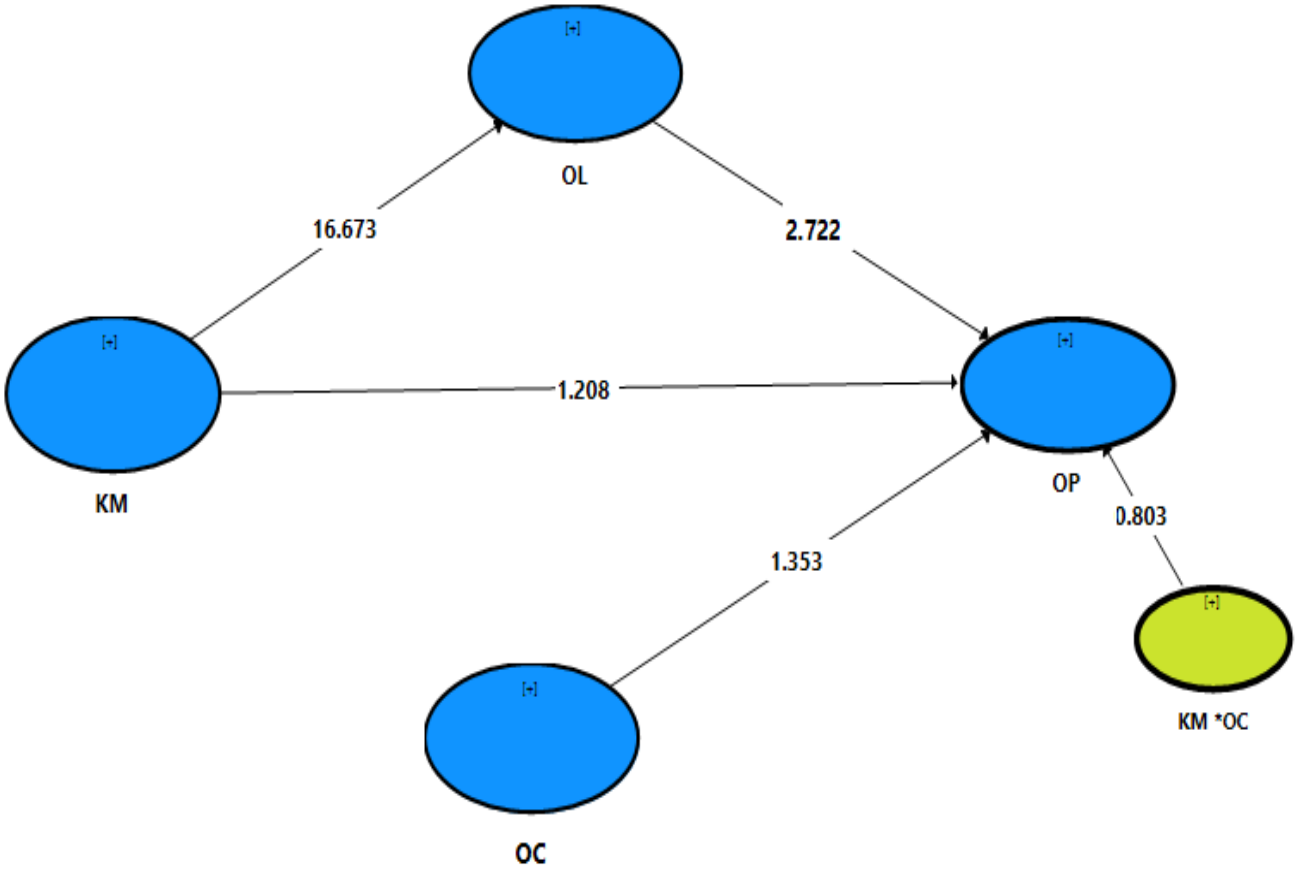


Figure 4.2a: Structural Regression Model with t Statistics

Source: Primary data (2018)

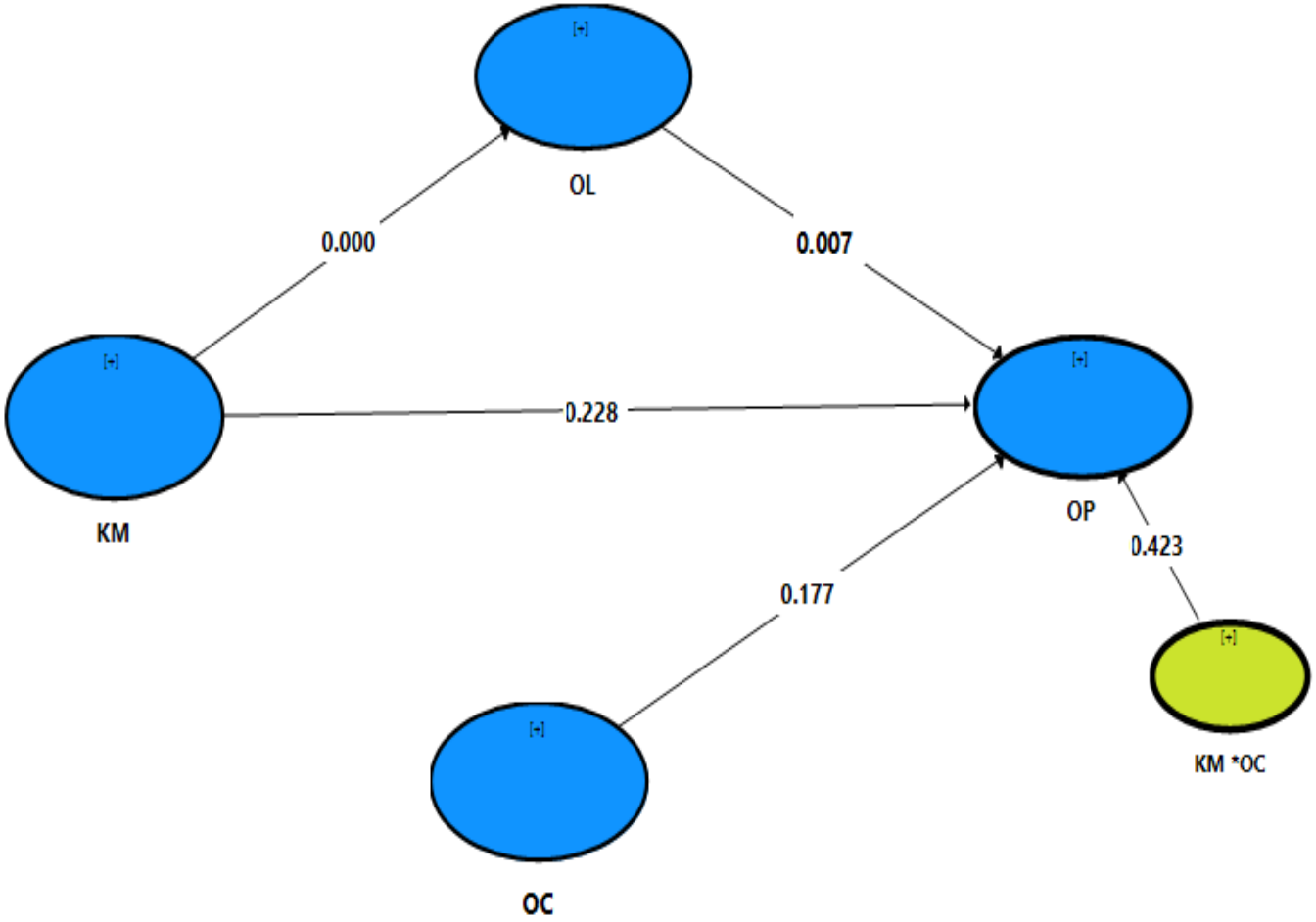


Figure 4.2 b: Structural Regression Model with P Values

Source: Primary data (2018)

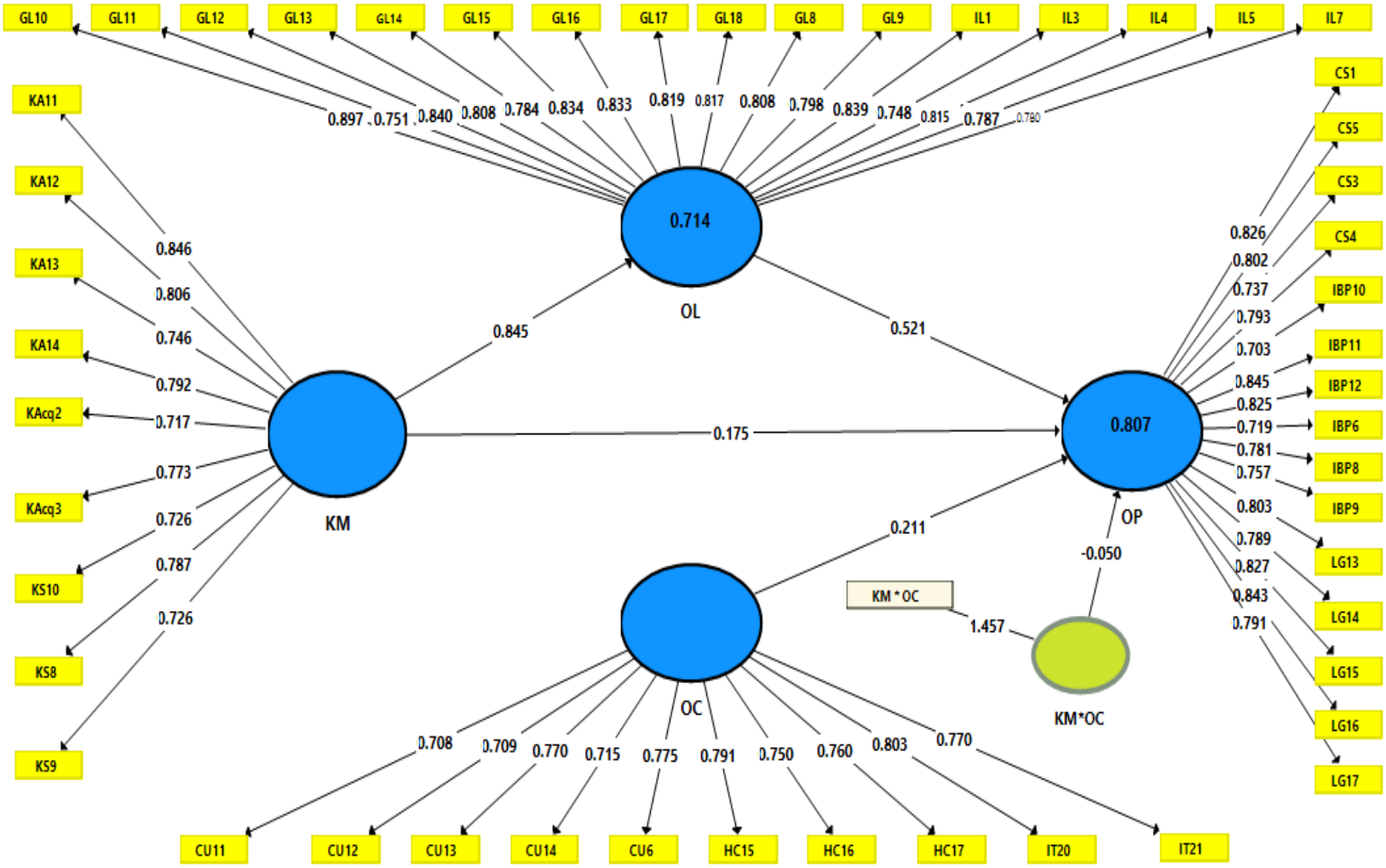


Figure 4.2c: Structural Regression Model with Path Coefficient and Indicator Loadings

Source: Primary data (2018)

4.7.1 Knowledge Management, Organisational Learning, Organisational Characteristics and Performance of Companies at the Nairobi Securities Exchange

The key objective of the extant study was to determine the relationships amongst knowledge management, organisational learning, organisational characteristics and performance of companies listed on the NSE. The relationships among knowledge management, organisational learning, organisational characteristics and organisational performance were analysed using the SmartPLS 3.2.1 software. Path coefficients were computed to determine both direction and strength of the relationships and the statistical significance of those relationships. The coefficient of determination (R^2) for the endogenous constructs was also determined. The R^2 change, also referred to as f^2 effect size measures were in addition established to strengthen the study's statistical significance research findings as recommended by Olejnik and Algina, (2003). The f^2 measures the specific exogenous constructs' effect on the endogenous construct R^2, f^2 value of 0.02 is taken to be small effect size, while 0.15 is medium and 0.35 denote large effect size (Hair, Ringle, and Sarstedt, 2013; Hair et al., 2014). The model relationships statistics are presented in Table 4.13.

4.7.1.1 The Hypothesized Relationship between Knowledge Management and Organisational Performance

Hypothesis 1 **(H_1)** proposed the presence of a relationship between knowledge management and organisational performance. PLS-SEM analysis was used to test this hypothesis. The path coefficients results were, $\beta = 0.801$, $t = 14.220$. $P < 0.05$. The predictive power (coefficient of determination) results were, $R^2 = 0.641$, $t = 7.130$, $P < 0.05$ and $f^2 = 1.786$. This indicates that 64.1% of the variance in organisational performance in this model can be explained by knowledge management. These results specify a positive statistically significant relationship between knowledge management and organisational performance. The f^2 effect size is large. Therefore H_1 is confirmed at the significance level of ($t > 1.96$, $P \leq 0.05$). Figures 4.3a) present this relationship.

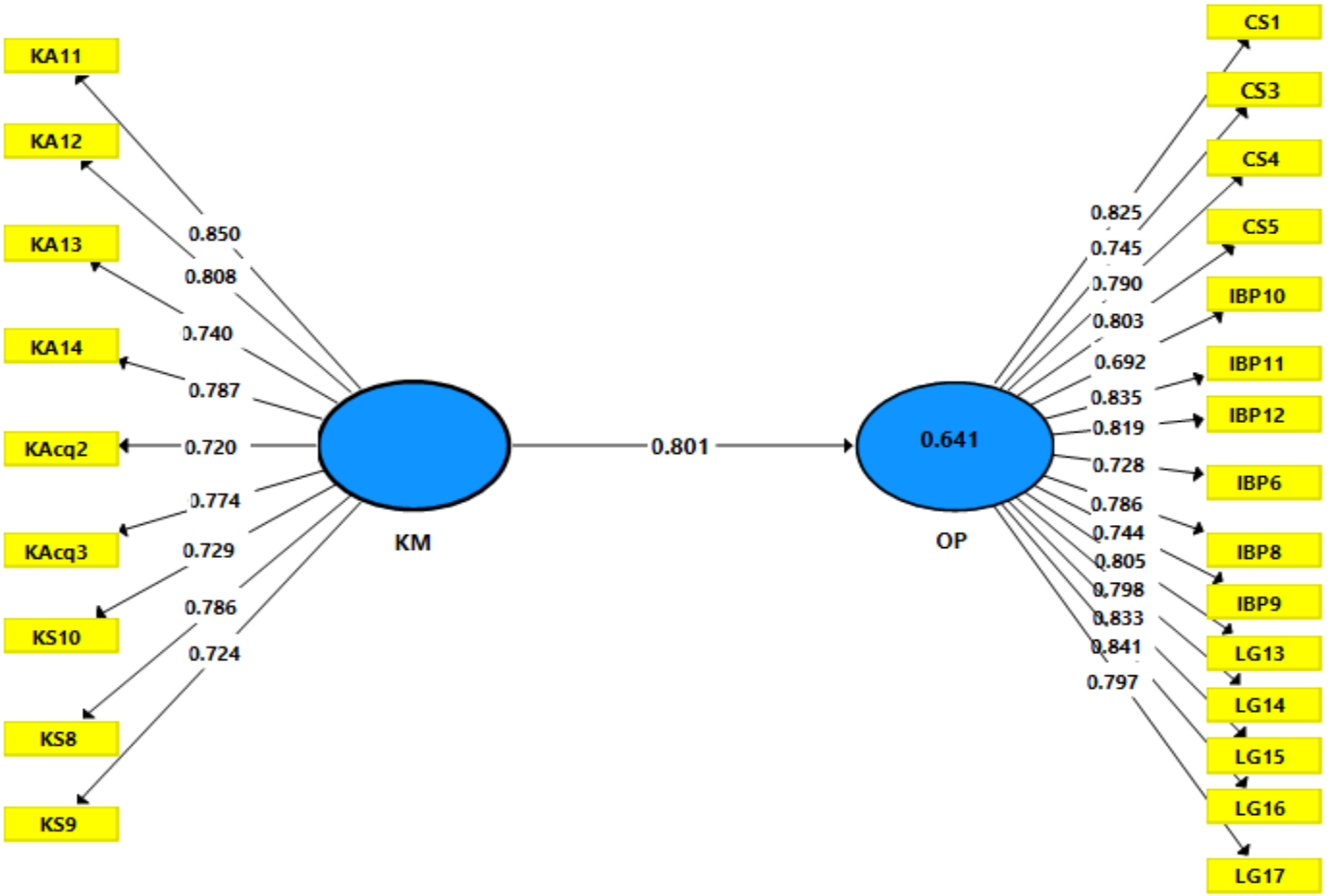


Figure 4.3a: Knowledge Management and Organisational Performance Path Coefficients, R2 and Indicator Loadings

Source: Primary data (2018)

4.7.1.2 The Hypothesised Mediation of Organisational Learning in the Relationship between Knowledge Management and Organisational Performance

Tests for the mediation effect were carried out in line with the recommendation of Preacher and Hayes (2004) and (2008). The first step involves bootstrapping to establish whether the direct relationship between knowledge management and organisational performance, was statistically significant. After bootstrapping the direct effect results were as follows; $\beta = 0.801$, $t = 14.220$. $P < 0.05$ and $R^2 = 0.641$, $t = 7.130$, $P < 0.05$ and $f^2 = 1.786$. This indicates that the direct path involving knowledge management, and organisational performance is statistically significant. This implies that inclusion of the mediator construct (organisational learning) will be meaningful. The direct path relationships are presented in figures 4.4a). When the mediator construct is included, this is referred to as the indirect path. To test for statistical significance in the indirect path, the model was analysed after bootstrapping. The model results for the indirect path were also found to be statistically significant. The indirect path results for the path coefficient were $\beta = 0.618$, $t = 4.375$, and $P < 0.05$ while those for coefficient of determination were $R^2 = 0.784$, $t = 11.637$ and $P < 0.05$. This indicates that organisational learning has a statistically significant mediation effect on the relationship between knowledge management and organisational performance at the significance level of ($t > 1.96$, $P \leq 0.05$). It indicates that the 78.4% of the variance in organisational performance can be attributed to the mediation effect of organisational learning in the relationship between knowledge management and organisational performance.

The study findings imply that organisational learning is a crucial mediator in the relationship between knowledge management and organisational performance. This is implied from the fact that the path coefficient (β) between knowledge management and organisational learning is positive and substantial ($\beta = 0.845$). To add on to this the predictive power (R^2) of knowledge management on organisational learning is also substantial ($R^2 = 0.714$). This indicates that 71.4 % of the variance in organisational learning can be attributed to knowledge management. The indirect path relationships are presented in Figure 4.4b) and 4.4c)

The next step involved calculation of the magnitude of the mediation effect. This was conducted by calculating the variance accounted for (VAF).

The formula for VAF is as follows:

VAF = Indirect effect/Total effect.

In the current study VAF is 0.618/0.795 = 0.777

This indicates that the magnitude of mediation is approximately 78 %. Any VAF value between 20% and 80% indicates partial mediation. The conclusion therefore is that the relationship between knowledge management and organisational performance is partially but strongly mediated by organisational learning. In view of these results, hypothesis two **(H_2)** which proposes that organisational learning mediates the relationship between knowledge management and organisational performance is confirmed.

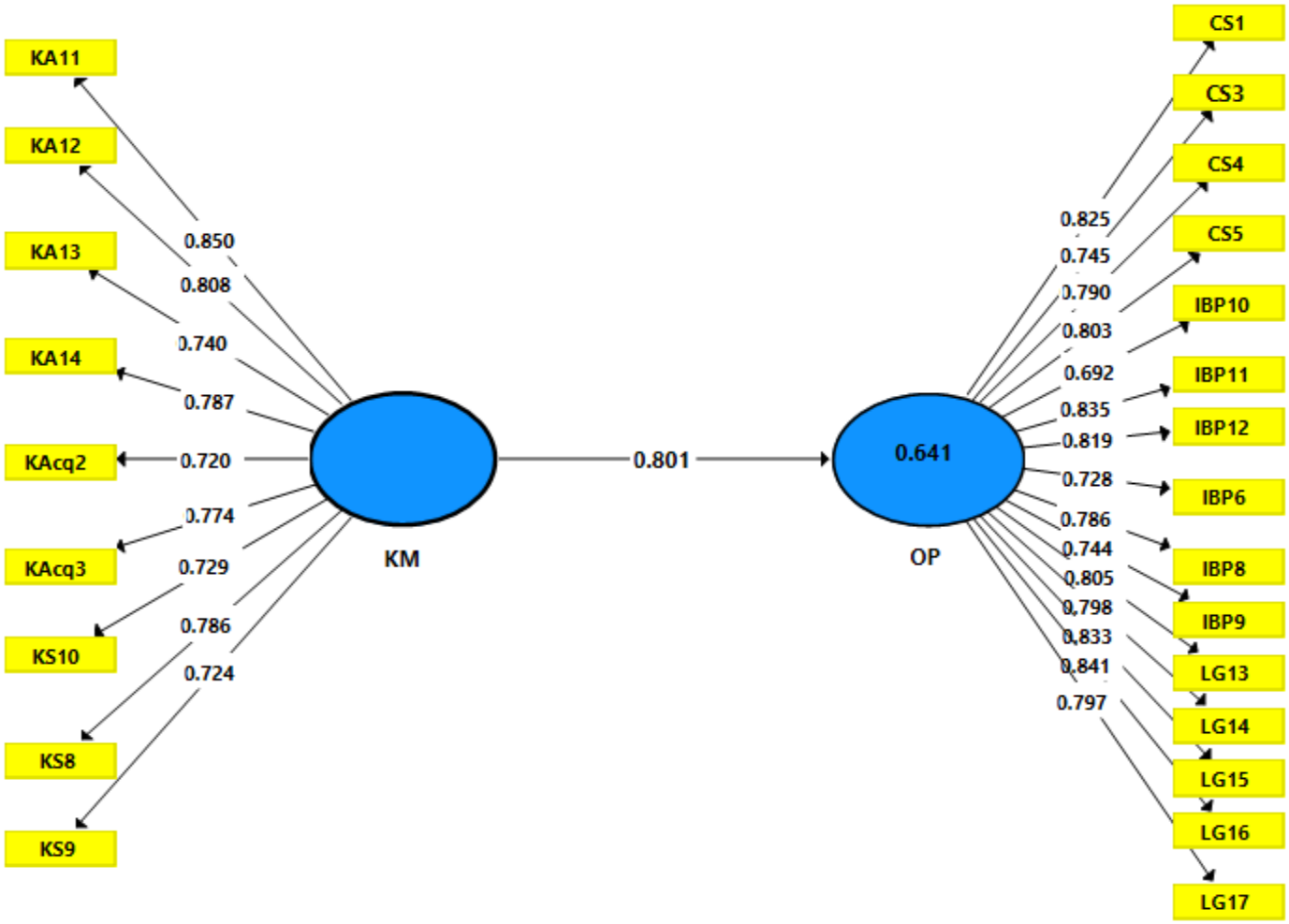


Figure 4.4a: Direct Path when the Mediating Variable organisational learning is excluded

Source: Primary data (2018)

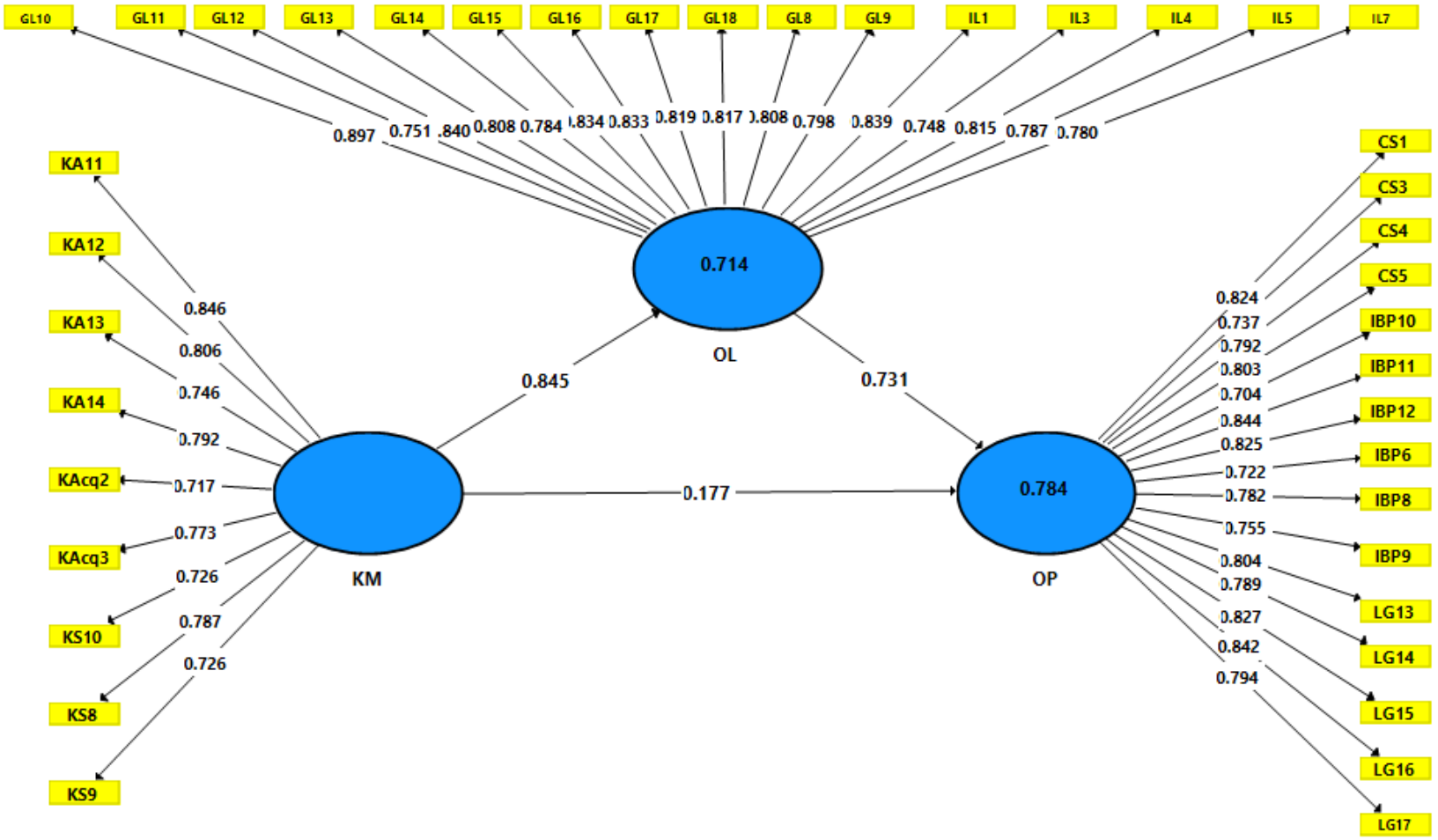


Figure 4.4b: Indirect Path where Organisational Learning Mediates the Relationship between Knowledge Management and Organisational Learning

Source: Primary data (2018)

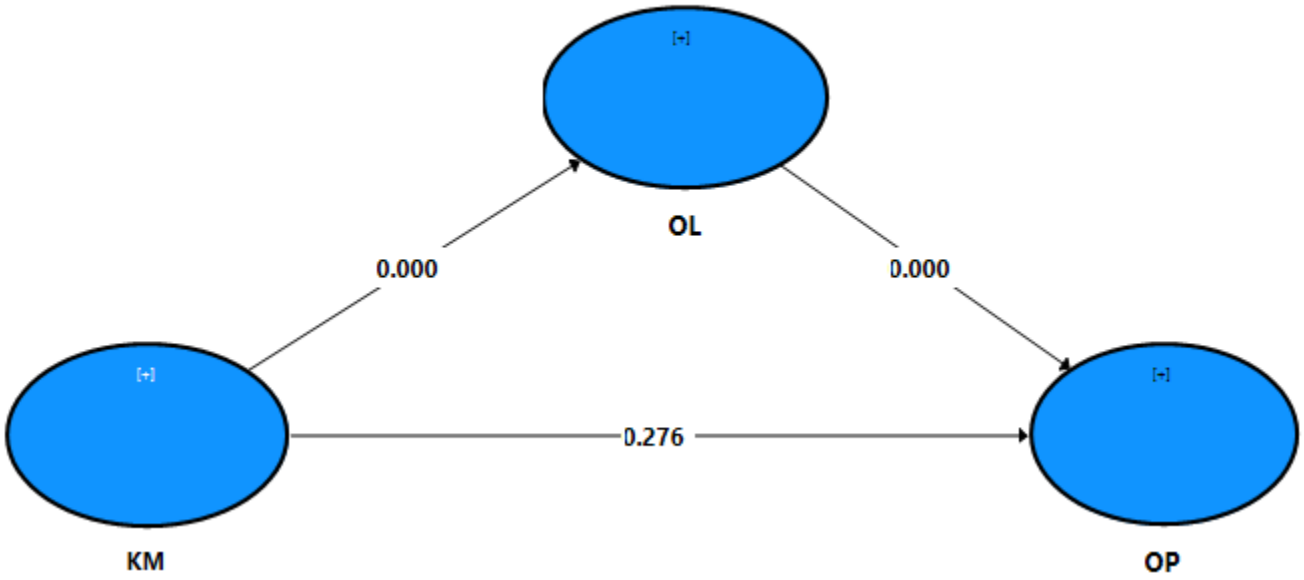


Figure 4.4c: P Values for the Constructs Path Relationships in the Mediation Relationship

Source: Primary data (2018)

4.7.1.3 The Hypothesised Moderating Effect of Organisational Characteristics in the Relationship between Knowledge Management and Organisational Performance

Hypothesis three (H_3) proposed that organisational characteristics has a moderating effect on the relationship between knowledge management and organisational performance. In structural equation modelling, a latent construct is categorised as either an exogenous construct or an endogenous construct. In this case organisational characteristics is an exogenous construct. The two stage method of PLS algorithm to analyse moderation was applied whereby, in addition to analysing the moderating effect of organisational characteristics on the relationship between knowledge management and organisational performance, its direct relationship with the endogenous variable "organisational performance" was also analysed. The test for moderation involved bootstrapping to test for significance. This gave rise to the following results: $\beta = -0.050$, $P > 0.05$, $t = 0.663$, while the coefficient of determination results were: $R^2 = 0.761$, $t = 10.54$, $P < 0.05$ and $f^2 = 0.014$, These results empirically reveal that the moderating effect of organisational characteristics on the relationship between knowledge management and organisational performance is negative but statistically insignificant at the significance level of ($P < 0.05$ and $t > 1.96$). The effect size (f^2) results for the moderation relationship is also small at 0.014. Therefore (H_3) which proposes that organisational characteristics moderate the relationship between knowledge management and organisational performance, was not supported. This relationship is presented in Figure 4.5a).

The direct effect of organisational characteristics on organisational performance path coefficient results were as follows: $\beta = 0.806$, $t = 18.020$, $P < 0.05$. The predictive power (R^2) results were: $R^2 = 0.649$, $t = 8.998$, $P < 0.05$, and $f^2 = 01.848$. This indicates that the direct relationship between organisational characteristics and organisational performance is positive and statistically significant and 64.9% of the variance in organisational performance is explained by this model. This gives a moderate predictive accuracy. The R^2 change also known as f^2 effect size value for the direct relationship is 1.848 which is a large effect size. This means that organisational characteristics in this relationship has a large proportion of predictive power. This relationship is presented in Figure 4.5b).

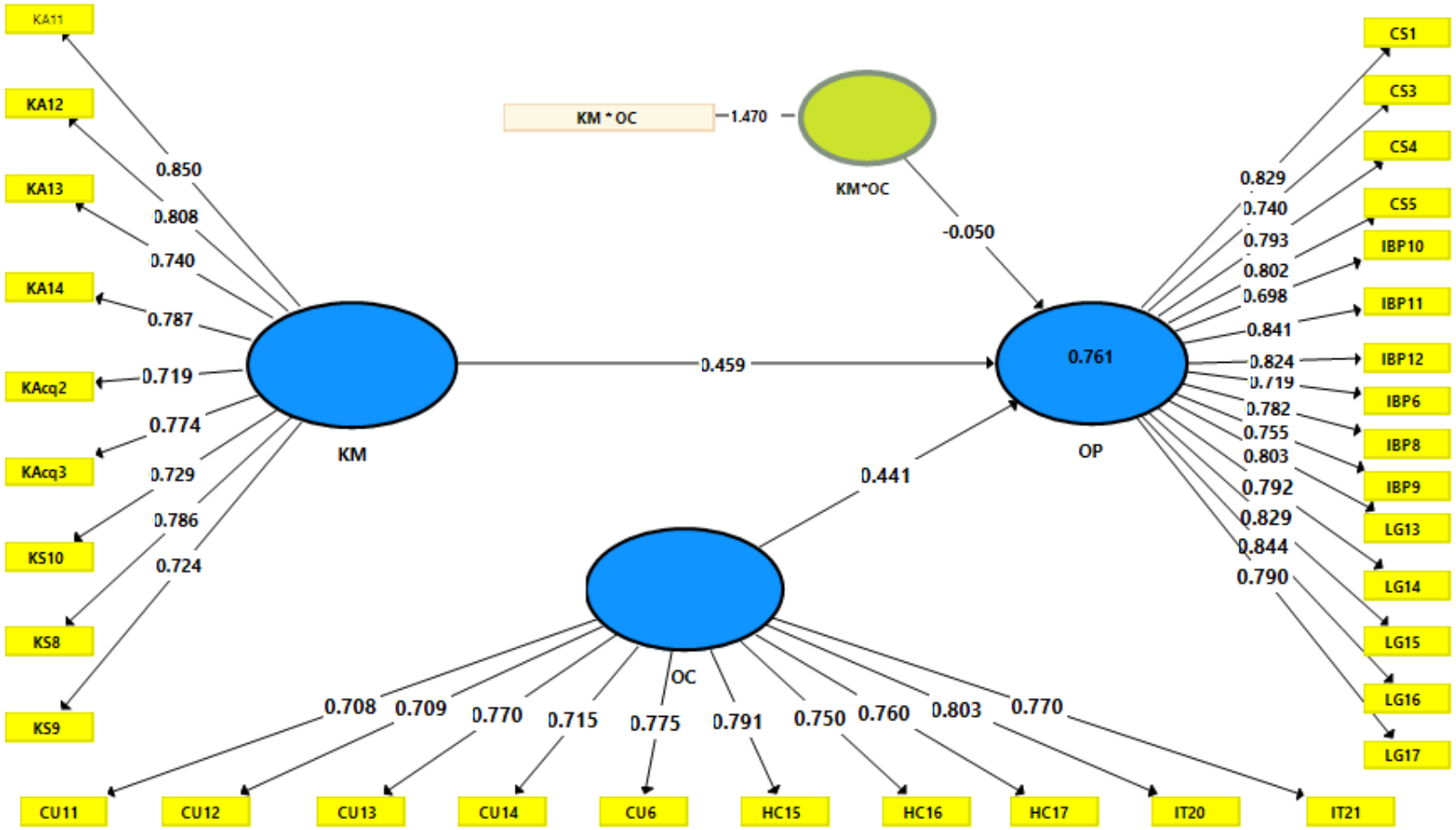


Figure 4.5a. Moderation Effect of OC on the relationship between KM and OP

Source: Primary data (2018)

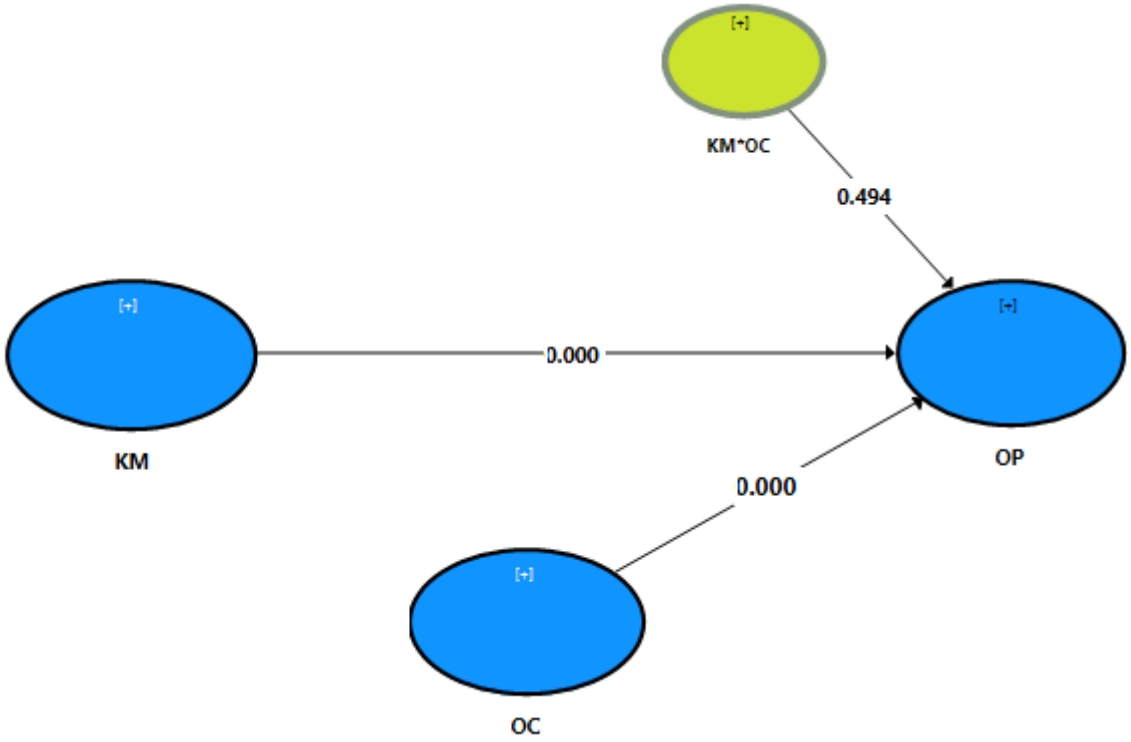


Figure 4.5b: P Values for the Path Relationships

Source: Primary data (2018)

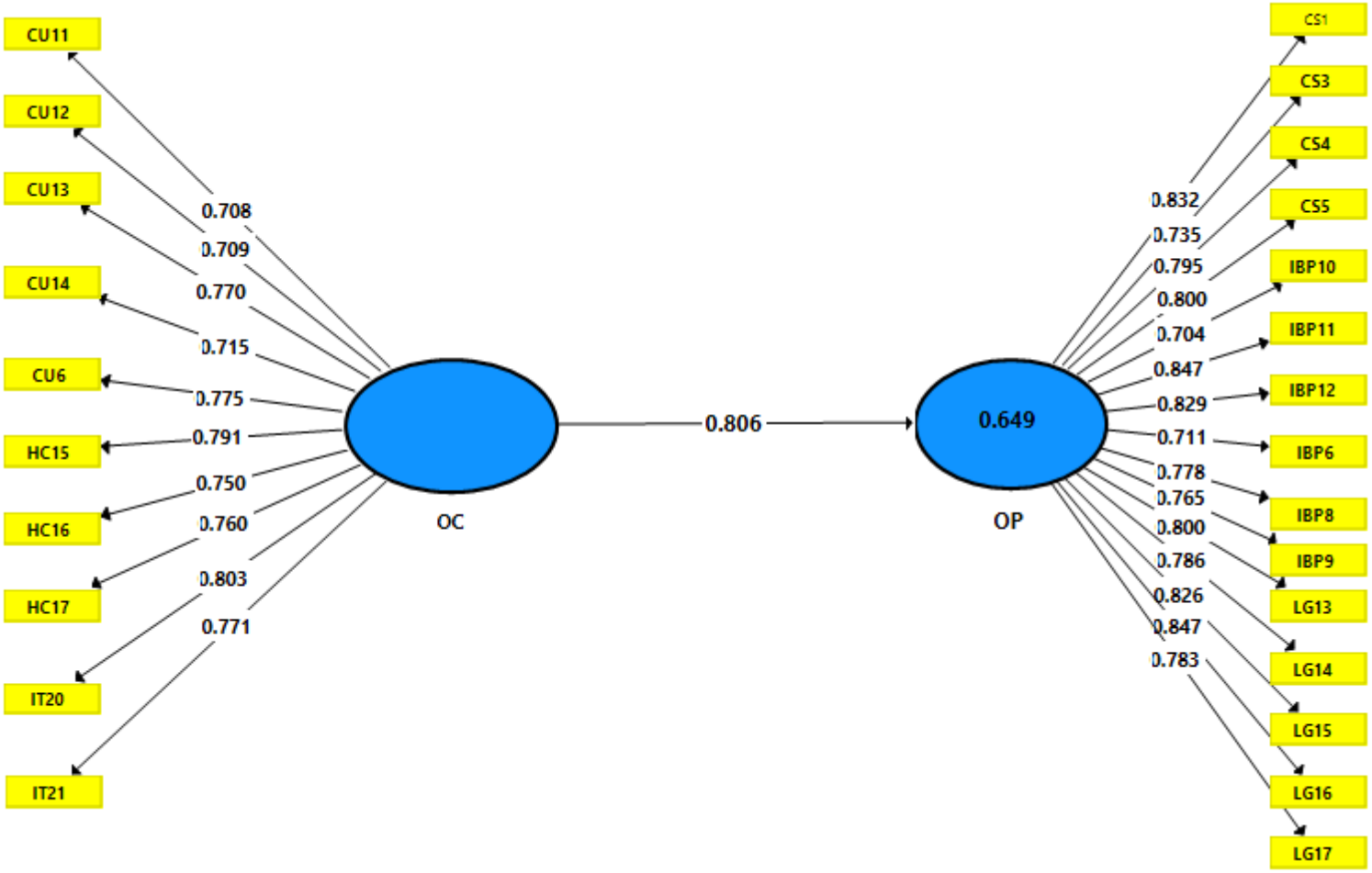


Figure 4.5c): Direct Effect of Organisational Characteristics on Organisational Performance and their Indicator Loadings

4.7.1.4 The Complementary Effect of Knowledge Management, Organisational Learning and Organisational Characteristics on Organisational Performance

Hypothesis four (H_4) proposes that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than that of the individual effect of knowledge management on organisational performance. This hypothesis is the basis for objective four in the extant study. The findings for this evaluation for the indirect path coefficients for the complementary model were: $\beta = 0.441$, $t = 2.7475$ and $P < 0.05$. The coefficient of determination results were: $R^2 = 0.804$, $t = 12.494$, $P < 0.05$. This means that 80.4 % of the variance in organisational performance can be explained by the complementary effect of knowledge management, organisational learning and organisational characteristics. This can be described as a substantial predictive power. It is critical to understand that in this complementary relationship, organisational learning mediates the path relationship between knowledge management and organisational performance. This indicates that the relationship between knowledge management and organisational performance is mediated by organisational learning. The complementary effect in this study is presented in table 4.13 and Figure 4.6.

Findings in the extant study indicate that the complementary effect of all the exogenous constructs combined, results into a greater effect on organisational performance than the effect of knowledge management on its own. Knowledge management on its own results into an R^2 value of 0.641, other results for the direct effect of knowledge management on organisational performance are $\beta = 0.801$, $t = 14.220$, and $P < 0.05$. This indicates that in a direct relationship between knowledge management and organisational performance, only 64.1% of the variance in organisational performance can be attributed to knowledge management. Findings reveal that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than that of the individual effect of knowledge management on organisational performance, therefore H_4 is confirmed.

The next step involved analysis of each exogenous latent construct's effect on the overall predictive power (R^2), also referred to as R^2 change or f^2 effect size. In addition, the models predictive relevance (Q^2) value was calculated. The f^2 values present the change effect on R^2 if any of the exogenous constructs was to be excluded from the model. If organisational learning was to be excluded from the model, the f^2 effect size would be 0.248 indicating that the R^2 would reduce by this magnitude. In the same vein f^2 effect size when organisational characteristics is excluded is 0.106; and 0.048 for exclusion of knowledge management. This implies that excluding organisational learning reduces the explained variance in organisational performance more than exclusion of any other exogenous variable. Therefore organisational learning is the most important explanatory construct among those in the current model. On the other hand exclusion of knowledge management would have the least effect in reduction of explained variance in organisational performance at an f^2 value of 0.048. This is due to the fact that organisation learning has a mediating role in the relationship between knowledge management and organisational performance. 71.4 % of the variance in organisational learning can be attributed to knowledge management.

The Q^2 value (cross validated redundancy) is a model fit measure which measures the predictive relevance of the model. Hair et al (2014), explains that Q^2 values are estimated through the blindfolding procedure. The purpose is to measure how well the path model predicts the observed values. A value where $Q^2 > 0$ is indicative of predictive relevance. In the current study the Q^2 values of all the relationships are greater than zero, therefore showing that all the exogenous constructs have predictive relevance for the endogenous constructs (organisational learning Q^2 = 0.402 and organisational performance $Q^2 = 0.415$. This indicates that the model has strong predictive relevance for both organisational learning and organisational performance because any Q^2 value above 0 indicates predictive relevance. As compared to the individual effect of knowledge management on organisational performance which achieved a $Q^2 = 0.323$, the complementary model is superior with a Q^2 value of 0.415 for organisational performance. Table 4.14 presents the R^2, f^2 and Q^2 results for the structural model. Table 4.15 presents a summary of the hypotheses test results.

Table 4.13: Indirect Path Coefficient Results for the Complementary Model

	Original Sample (O)	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
KM -> OL				
KM -> OP	0.4412	0.1606	2.7475	0.0062
OC -> OP				
OL -> OP				

Table 4.14 The Model Change Effect Values (f2) for R2 and Q2

	Organisational performance including all variables (R^2 = 0.804)	Organisational performance (R^2 Change; f^2)	Organisational performance (Q^2 = 0.415)	q^2effect size
Without knowledge management	0.798	0.048	0.413	0.003
Without organisational characteristics	0.784	0.106	0.405	0.017
Without organisational learning	0.761	0.248	0.392	0.039
With all constructs included	0.804		0.415	-
With only knowledge management	0.641		0.323	

Source: Primary Data

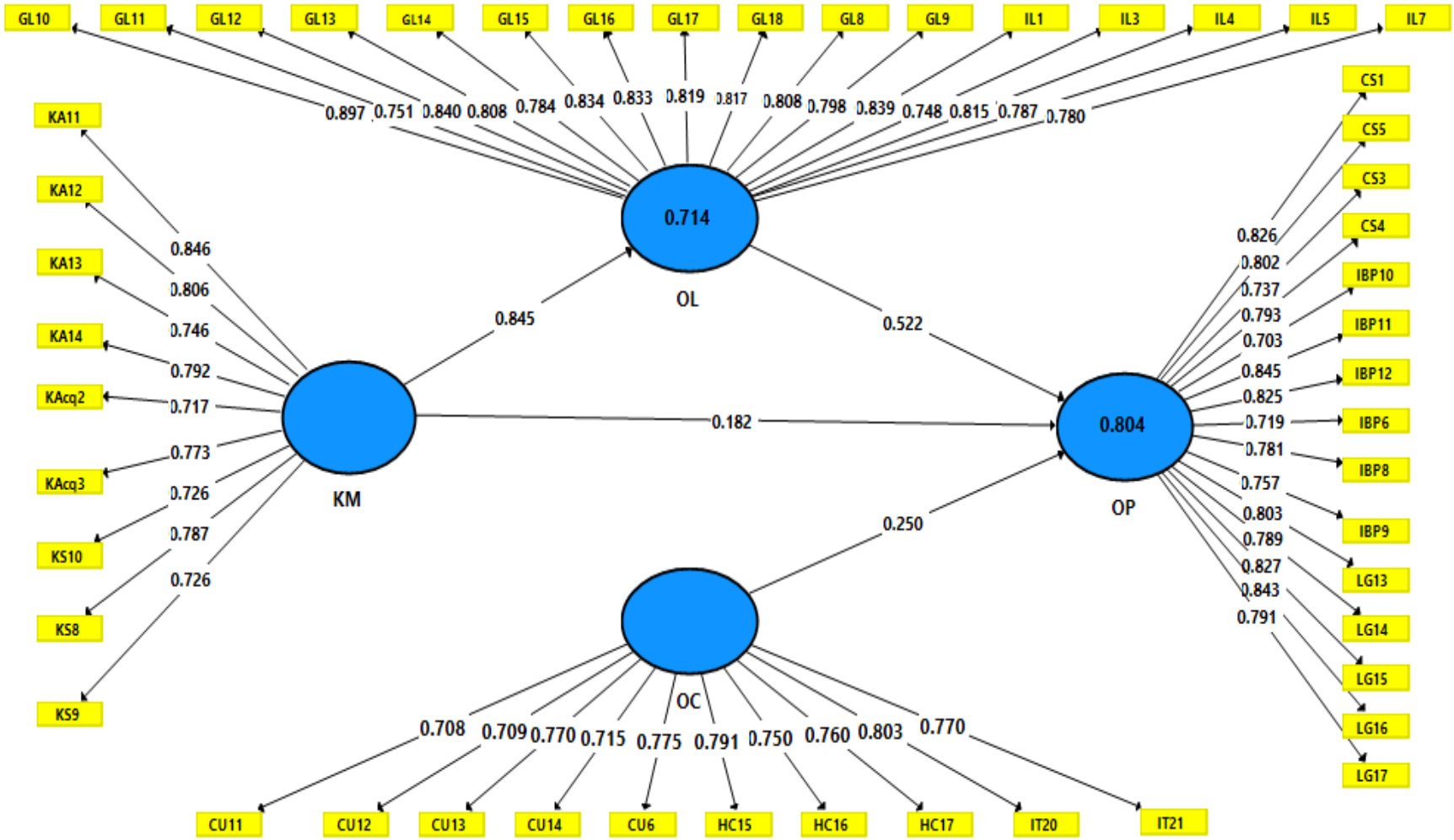


Figure 4.6: Complementary Model; Path Relationships, Predictive Power and Indicator Loadings

Source: Primary Data

Table 4.15: Summary of the Results of the Tests of Hypotheses

Objective	Hypothesis	Results	Remarks
To determine the influence of knowledge management on organisational performance	There is a relationship between knowledge management and organisational performance	$\beta = 0.801$, $t = 14.220$, $P < 0.05$ $R^2 = 0.641$, $t=7.130$, $P< 0.05$	H_1 is confirmed
To establish the mediating role of organisational learning in the relationship between knowledge management and organisational performance.	Organisational learning mediates the relationship between knowledge management and organisational performance.	$\beta = 0.618$, $t = 4.375$, and $P < 0.05$ $R^2 = 0.784$, $t = 11.637$, $P < 0.05$ VAF = 78%	H_2 is confirmed
To establish whether organisational characteristics moderate the relationship between knowledge management and organisational performance.	Organisational characteristics moderate the relationship between knowledge management and organisational performance.	$\beta = -0.050$, $t = 0.663$, $P > 0.05$ $R^2 =0.761$, $t =10.54$, $P < 0.05$ $f^2 =0.014$	H_3 is not supported
To determine whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance.	The complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance	β for KM on OP = 0.801, $t = 14.220$, $P < 0.05$ R^2 for KM on OP = 0.641, $t =7.130$, $P< 0.05$ β for KM,OL and OC on OP = 0.441, $t = 2.7475$, $P < 0.05$ R^2 for KM, OL and OC on OP = 0.804 $t =12.494$, $P < 0.05$ f^2 of KM=0.048 f^2 of OC = 0.106 f^2 of OL =0.248 Q^2 for OL = 0.402 Q^2 for OP = 0.415	**H_4** is confirmed

4.8 Discussions and Implications

In this section interrogation of the research findings was carried out. In addition the findings of related past empirical studies are discussed in comparison to the findings. The findings of the extant study are also discussed in comparison to the various theories underpinning the study. These discussions have been presented under the headings of the respective objectives and hypothesis of this study.

4.8.1 The Relationship between Knowledge Management and Organisational Performance

Hypothesis one **(H_1)** involved testing whether there is a relationship between knowledge management and organisational performance. This involved testing the direct relationship between knowledge management and organisational performance. The results generated were as follows, $\beta = 0.801$, $t = 14.220$, and $P < 0.05$ while $R^2 = 0.641$, $t = 7.130$, $P < 0.05$ and $f^2 = 1.786$ This means that when the model involves only knowledge management and organisational performance on their own, findings reveal a positive and significant path relationship at a significance level of ($t > 1.96$, $P \leq 0.05$). It also means that 64.1 % of the variance in organisational performance can be explained by knowledge management.

Resource-based theory was developed in an attempt to explain how organisations attain long lasting competitive advantage. RBV holds that competitive advantage emanate from organisational resources and competences characterized by value and are rare, inimitable and unsubstitutable (Barney, 1991). According to Prahalad and Hamel (1990), these constitute an organisations' unique competences which hence result into long term competitive advantage. The extant study therefore agrees with RBV and KBV that knowledge and consequently knowledge management are critical resources towards the achievement of sustainable competitive advantage in all organisations. This is especially so because for organisations to perform in the current global interconnected economy, they have to access information rapidly and effectively. Long-term competitive advantage is currently underpinned by successful conveyance of intellectual capital as opposed to tangible assets and financial strength (Seubert, Balaji and Makhija, 2001).

Scholars have linked dynamic capabilities to organisational knowledge. This being the case, they suggest that dynamic capabilities influence the sustained and long lasting rejuvenation of the organisation. These are underpinned by the application of extant knowledge-based competencies and the acquisition of fresh knowledge-based competencies (Gibson and Birkinshaw, 2004). Sarvary (1999), holds that as knowledge is generated and transferred throughout the organisation, it has the capability to enhance the organisations value by improving its ability to react to vibrant modifications in the environment. The results of the current study on the relationship between knowledge management and organisational performance support the dynamic capabilities theory which implies that knowledge and consequently knowledge management enhance organisational capabilities resulting into organisational performance.

The results of the current study indicate a positive and significant relationship between knowledge management and organisational performance. This revelation is in line with previous empirical studies such as Forghani et al., (2017), who found that there was a significant relationship amongst knowledge management dimensions and organisational performance in lean manufacturing in Iran. Empirical studies by Hitt et al. (2001); Bogner et al. (1999), found knowledge to be a very critical intangible asset within which information is embedded.

Choi et al. (2008) studied the effect of knowledge management strategy on organisational performance and concluded that some strategies had a positive correlation with organisational performance while others were negatively correlated with organisational performance. Mills and Smith (2011) report was inconclusive on the knowledge management capability-performance link, they found that not every dimensions of knowledge management capability is significantly correlated with performance.

Scholars seem to have reached a consensus that knowledge management will be the most significant source of competitive advantage for organisations in future (Ferran-Urdaneta, 1999). Practitioners in US and Europe, have reached a consensus that knowledge is crucial for sustainable competitive advantage and greater performance (KPMG Management Consulting, 1998; Price Water House Coopers and World Economic Forum 1999).

4.8.2 The Mediating Role of Organisational Learning in the Relationship between Knowledge Management and Organisational Performance

Hypothesis two (**H_2**) proposed that organisational learning mediates the relationship between knowledge management and organisational performance. The analysis for the mediation involved testing the direct relationship between knowledge management and organisational performance. This necessitated dropping the mediating construct from the model before running the test. The direct relationship was revealed to be both positive and statistically significant. Results were as follows, $\beta = 0.801$, $t = 14.220$. $P < 0.05$ and $R^2 = 0.641$. This indicates that inclusion of a mediator construct would be meaningful.

The second step involved testing for the mediation by running the model with bootstrapping. Constructs involved in this relationship are knowledge management, organisational learning and organisational performance. In this study the mediator construct is organisational learning. The test results for this indirect relationship were as follows, $\beta = 0.618$, $t = 4.375$, $P < 0.05$ and $R^2 = 0.784$, $t = 11.637$, $P < 0.05$. The results were found to be positive and statistically significant at the significance level of ($t > 1.96$, $P \leq 0.05$). This means that 78.4% of the variance in organisational performance can be attributed to the mediation of organisational learning on the relationship between knowledge management and organisational performance. This reveals that the influence of knowledge management on organisational performance is indirect as it is mediated by organisational learning.

Having confirmed mediation, a third test was carried out to determine the magnitude of the mediation. This is the Variance Accounted For test (VAF). The VAF value was 0.777 or approximately 78 %. This indicates that organisational learning strongly but partially mediates the relationship between knowledge management and organisational performance. Any VAF value between 20% and 80% indicates partial mediation while a VAF value over 80% indicates full mediation. The study found that a large proportion of organisational learning result from knowledge management. The effect of knowledge management on organisational learning is substantial at $R^2 = 0.714$. This means that 71.4% of the variance in organisational learning can attributed to knowledge management. The path coefficient between the two is also substantial at $\beta = 0.845$. This reveals a very strong relationship between the two.

The extant study reveal that organisational learning partially mediates the relationship between knowledge management and organisational performance. A major proportion of organisational learning is due to knowledge management. This consequently affects organisational performance. It also found that the mediation role of organisational learning in the relationship was strong with a VAF 78%. This confirms the proposition by Huber's (1991) organisational learning literature critique, that an organisation learns when it gains knowledge which it deems to be potentially useful in its activities and processes.

The current study findings are in agreement with Luxmi (2014), which concluded that organisational learning partially mediates the relationship between knowledge management and organisational performance. However, the researcher collected data in only eight Indian organisations in the service and manufacturing sectors, implying that the results could not be generalized across all organisations. A study by Liao and Wu (2009), had findings that differ from the extant study on the magnitude of mediation, they reported that organisational learning fully mediates the relationship between knowledge management and organisational performance while the extant study reported a partial mediation. The study by Liao and Wu (2009) was prone to extreme bias because it was conducted in knowledge intensive organisations that were listed in the Common Wealth Magazine of the top 1000 manufacturers and the top 100 financial firms. It did not include organisations that were had moderate and poor performance.

4.8.3 The Moderating Effect of Organisational Characteristics on the Relationship between Knowledge Management and Organisational Performance

Hypothesis three (**H_3**) proposed that organisational characteristics moderate the relationship between knowledge management and organisational performance. The current study used the two stage method of PLS algorithm to test for moderation. The results achieved were: $\beta = -0.050$, $t = 0.663$, $P > 0.05$, $f^2 = 0.014$. This indicates that organisational characteristics (culture, human capital and information technology) have a negative moderating effect on the relationship between knowledge management and organisational performance, however this effect was found to be statistically insignificant at a significance level of ($t > 1.96$, $P \leq 0.05$). This means that organisational characteristics do not have a moderating effect on the relationship between knowledge management and organisational performance. This being the case **H_3** is not supported.

The organisational characteristics in the original model included organisational structure, culture, human capital and IT infrastructure. However all the indicators on organisational structure were dropped from the model because none of them achieved the minimum requirement loading of 0.7 for composite reliability. As a results the indicators that were retained for organisational characteristics were culture, human capital and IT infrastructure.

The current study found that organisational characteristics which consist of organisational culture, human capital and IT infrastructure, had a negative statistically insignificant moderating effect on the relationship between knowledge management and organisational performance. Therefore **H_3** which proposed that organisational characteristics have a moderating effect on the relationship between knowledge management and organisational performance was not supported. However, the results of the direct relationship between organisational characteristics and organisational performance indicate a statistically significant relationship as follows: $\beta = 0.806$, $t = 18.020$, $P < 0.05$. The predictive power (R^2) results were: $R^2 = 0.649$, $t = 8.998$, $P < 0.05$, and $f^2 = 01.848$.

The extant study concluded that organisational characteristics did not have a moderating role on the relationship between knowledge management and organisational performance. Similar past studies on the moderating role of organisational characteristics on the relationship between knowledge management and organisational performance were hard to come by. However, Danish, Din Butt and Munir (2012), found a positive moderating relationship of organisational culture in the relationship between knowledge management and organisational effectiveness.

4.8.4 The Complementary Effect of Knowledge Management, Organisational Learning and Organisational Characteristics on Organisational Performance

SEM has been heralded as a second generation analysis technique with improved abilities when compared with the first generation analysis techniques. One of these improvements is its flexibility which enables the tests of the different construct relationships. This can be achieved by testing the different combinations of both the observed and latent constructs in a model (Kline, 2011). In view of this the current study tested various construct combination relationships in addition to the overall complementary effect of all the exogenous constructs on the endogenous constructs. This was done in the analysis of **H_4** in this study.

H_4 proposed that the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance was greater than the individual effect of knowledge management on organisational performance. Statistical tests results for this hypothesis confirmed this proposition. The models overall predictive power (R^2) value was 0.804 meaning that 80.4 % of the variance in organisational performance can be attributed to the complementary effect of knowledge management, organisational learning, and organisational characteristics. On the other hand, the predictive power (R^2) value for the direct relationship between knowledge management and organisational performance was 0.641, which is much smaller than the complementary effect of 0.804. These results are presented in Table 4.16.

Each exogenous construct, namely knowledge management, organisational learning and organisational characteristics, made a respective contribution to the overall predictive power (R^2) of the endogenous construct (organisational performance) as indicated by the f^2 values. However the predictive power of the model does not change much when any of the individual exogenous constructs namely: knowledge management, organisational learning and organisational characteristics is omitted from the model. The extent of change in the predictive power when one exogenous construct is excluded is referred to as R^2 change (f^2). The f^2 results were as follows when a respective exogenous construct was omitted from the model were: knowledge management 0.048, organisational learning 0.248 and organisational characteristics, 0.106. The overall R^2 value for the complementary effect is 0.804. Omission of organisational learning resulted in the biggest f^2 values at 0.248. While omission of the key exogenous construct 'knowledge management', resulted into f^2 value of 0.048, indicating the lowest predictive relevance when it is within the model. This unexpected result is largely due to the fact that the effect of knowledge management on organisational performance is not a direct one, it is indirect in that it is mediated by organisational learning. This confirms that the complementary constructs have a much larger effect on organisational performance as compared to the individual effect of knowledge management on organisational performance.

The Q^2 value is a computation of the predictive relevance of the model for the endogenous construct (organisational performance). A Q^2 value of above 0 reveals that the extant model has predictive relevance. In this model the predictive relevance for organisational performance due from the complementary model which includes: knowledge management, organisational learning and organisational characteristics is strong at 0.415. Therefore the main model is superior when compared to one with only knowledge management as the only exogenous construct and organisational performance as the endogenous construct which has a Q^2 value of 0.323.

The q^2 value is the Q^2 change effect and indicates the change in the models predictive relevance caused by the exclusion of an individual exogenous constructs. The q^2 value is the measure of the contribution of an individual exogenous constructs in the predictive relevance of the endogenous construct. In the current study the q^2 value of each individual exogenous constructs is less than the overall Q^2 of the endogenous construct. Specifically, the respective q^2 values for knowledge management is 0.003, organisational characteristics 0.017 and organisational learning 0.039, while the overall Q^2 value for performance is 0.415. This means that the predictive relevance of the overall model involving all the three exogenous constructs is superior as compared to a model with only knowledge management.

The findings on **H_4** indicate that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is greater than that of knowledge management on its own. This is in agreement with both the theory of complementarities and dynamics capabilities theory. Dynamic capabilities denote the organisation's capacity to develop, adjust or create the internal resources and capabilities that enable it not only to survive but also attain competitive advantage and hence performance in a business environment that is subject to dynamic volatility. This capability is determined by complex organisational processes, an organisation's firm specific resource positions, and the reengineering directions an organisation has adopted which will in turn influence the array of probable changes to its current capabilities (Teece et al., 1997).

The extant study found that the different exogenous constructs complement each other in organisations listed at the NSE, to enhance performance. The extant study findings thus support the theory of complementarities which hold that an activity in an organisation will lead to higher performance while it is conducted simultaneously with another complementary activity (Choi et al. 2008). This also supports the dynamic capabilities theory which holds that using organisational resources as complements of each other enhances the capabilities of the organisation to operate and perform in a highly dynamic business environment.

Empirical studies on complementarities concerning knowledge management in the past came up with contradicting results. Barely and Chakrabarti (1996), found that there was a complementary relationship among knowledge management strategies which resulted into improved organisational performance. Similarly, Cavaleri (2004), found that knowledge management and organisational learning are complementary and when used together enhance organisational performance. In contrast, Choi et al., (2008), concluded that explicit and tacit strategies were not complementary to each other.

4.9 Respecified Model

The extant study reveals that some of the relationships as proposed by the original conceptual model were not supported by the research results. Based on these findings, the study proposed a reconfigured conceptual model. The reconfigured model proposes that there is a relationship between knowledge management and organisational performance; that the relationship between knowledge management and organisational performance is mediated by organisational learning: that there is a relationship between organisational characteristics and organisational performance and that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance. Figure 4.7 represents the reconfigured conceptual model.

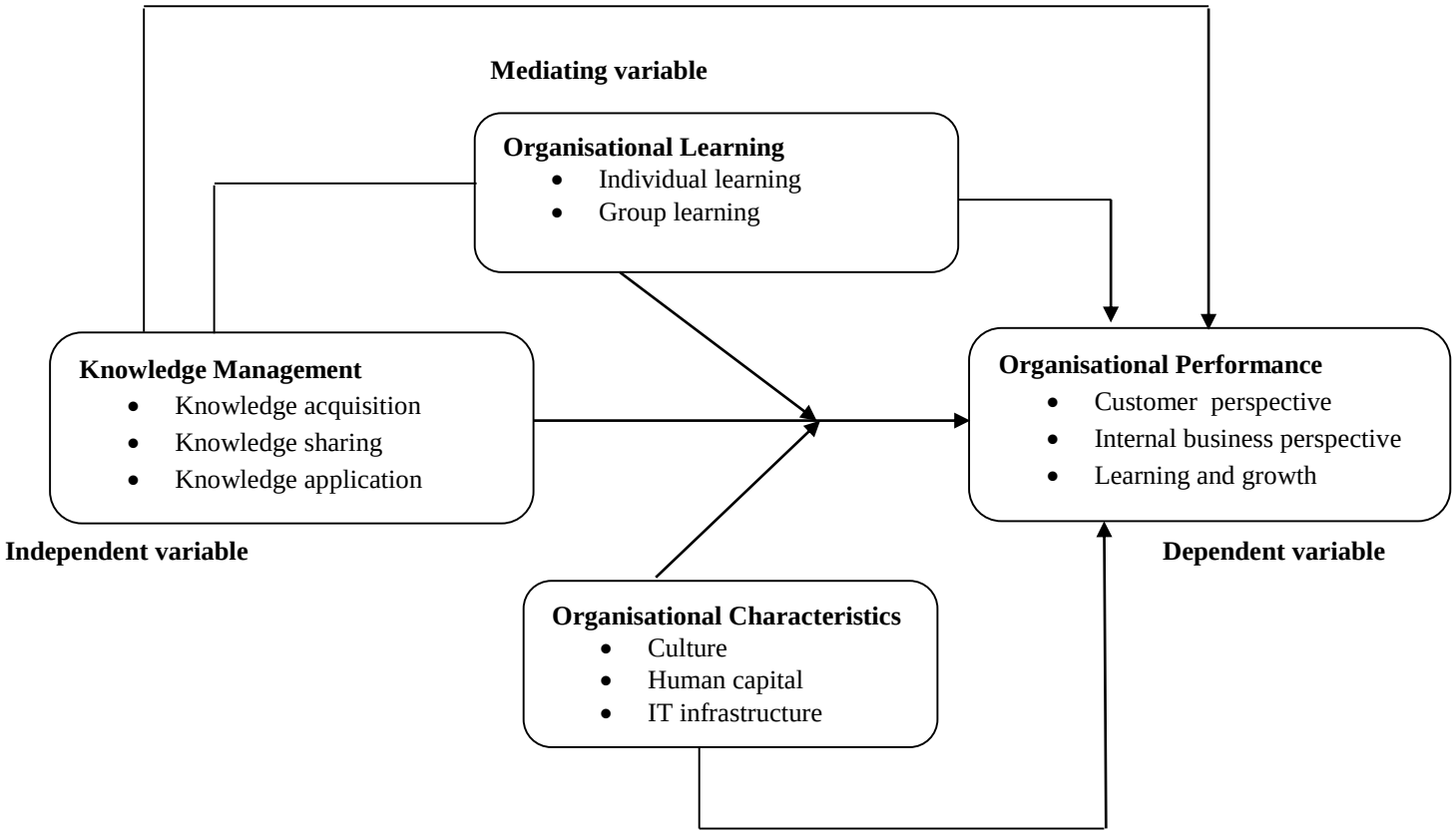


Figure 4.7: Reconfigured Conceptual Model

Source: Current Researcher

CHAPTER FIVE
SUMMARY, CONCLUSION, AND IMPLICATIONS

5.1 Introduction

Chapter five consists of a summarised overview of the research outcomes for the particular research hypotheses and the related objectives. It also presents the conclusions from the study outcomes as well as the study's contributions and recommendations. The study's limitations are also discussed and potential areas of future studies suggested.

5.2 Summary of Findings

The overall purpose of the study was to establish the relationships among knowledge management, organisational learning, organisational characteristics and organisational performance of companies listed in the Nairobi Securities Exchange. Of particular interest was the establishment of the role of the complementary relationship among all the exogenous constructs (knowledge management, organisational learning, and organisational characteristics) and the effect of this complementary relationship on the endogenous construct (organisational performance). To achieve this a conceptual model guided by empirical literature was created. This was then used to design a structural equation model. In these, four hypotheses were proposed corresponding with the four research objectives. These were used to assess the conceptual relationships that were proposed.

Specific objectives were as follows: to determine whether there is a relationship between knowledge management and organisational performance; to establish the mediation role of organisational learning on the relationship between knowledge management and organisational performance; to establish the influence of organisational characteristics on the relationship between knowledge management and organisational performance; and to determine whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance.

To test the proposed relationships, a survey was done and data collected from 46 companies listed on the NSE out of a possible 61 companies. Out of the 46 responses only 43 could be used, a response rate of 73%. The data was then analysed using PLS-SEM. A summary of the findings of each of the research hypothesis are presented in the subsequent sections.

PLS-SEM, was used to investigate the relationships as proposed in the study's conceptual and SEM models. The study applied the SmartPLS 3.2.1 software. The central goal of the extant study was prediction of the covariance of the model constructs, therefore PLS-SEM was chosen as the appropriate statistical technique. PLS SEM was also appropriate because of the small number of the companies listed on the Nairobi Securities Exchange. The PLS-SEM analysis consists of two phases the first being analysis of the measurement model also referred to as the outer model. This phase was aimed at establishing the reliability and validity of the measurement model. In this the indicator loadings were examined and those that did not achieve the minimum requirement for indicator loadings of 0.7 were dropped one by one and the loadings readings were reexamined every time one was dropped until all had loadings of 0.7 and above. With this the original model was respecified. This led to indicator reliability where the threshold of 50% for all loadings was achieved.

Tests for internal consistency reliability for each construct, were carried out by checking the composite reliability and Cronbach alpha value which required a threshold value of 0.7 and above. Results exceeded the minimum requirement for all the four constructs. Convergent validity tests were also done. For this, the Fornell and Larcker criterion was used to calculate the AVE. All constructs achieved the minimum requirement of an AVE value of 0.50 which indicated that the respecified model has convergent validity. Discriminant validity was also established meaning that the constructs in the model are distinctive and can be identified by components not represented by any other construct within the model. Having done all this, it was established that the measurement model satisfied the requirements for reliability and validity.

Valuation of the structural model is carried out once the measurement model has been validated. The coefficient of determination R^2 results were found to be significant for the two endogenous constructs of the study namely organisational learning with a R^2 value 0.714 and organisational performance with R^2 value of 0.807. This demonstrated strong predictive power or explanatory power of the model for both endogenous constructs. The models predictive relevance (Q^2) results for both organisational learning and organisational performance were 0.402 and 0.417 respectively. This implies strong predictive relevance because the benchmark is that any value above zero indicates predictive relevance. The model was found to have stronger predictive power when it includes knowledge management, organisational learning, and organisational characteristics.

5.2.1 Knowledge Management and Organisational Performance

The first objective of the extant study was to determine whether there is a relationship between knowledge management and organisational performance. Using SmartPLS 3.2.1 application, PLS SEM analysis was conducted to test the direct relationship between knowledge management and organisational performance. Results indicated that knowledge management had a positive and statistically significant effect on organisational performance. The result were; $\beta = 0.801$, $t = 14.220$. $P < 0.05$, while $R^2 = 0.641$, $t = 7.130$, $P < 0.05$ and $f^2 = 1.786$. The findings further extend the argument in RBV and KBV where knowledge is a crucial resource with the capability to enhance an organisation's competitive advantage (Grant, 1996).

5.2.2 The Mediation Role of Organisational Learning in the Relationship between Knowledge Management and Organisational Performance

Objective two involved establishing the mediation role of organisational learning on the relationship between knowledge management and organisational performance. The mediation test in PLS SEM required that a bootstrap test be carried out to find out whether the direct relationship between knowledge management and organisational performance without the mediating construct (organisational learning) is statistically significant. If the direct relationship is not statistically significant, there can be no mediation.

The direct relationship between knowledge management and organisational performance was revealed to be positive and statistically significant as presented by the following

results: $\beta = 0.801$, $t = 14.220$. $P < 0.05$ and $R^2 = 0.641$, $t = 7.130$, $P < 0.05$ and $f^2 = 1.786$. This meant that inclusion of a mediator construct would yield meaningful results. A second bootstrap test was then conducted for the indirect relationship where the mediating construct (organisational learning) was included in the model. This indirect relationship was also found to be positive and statistically significant: $\beta = 0.618$, $t = 4.375$, $P < 0.05$ and $R^2 = 0.784$, $t = 11.637$, $P < 0.05$. These results indicate that organisational learning positively mediates the relationship between knowledge management and organisational performance. This mediation role is statistically significant. The magnitude of mediation was measured through the VAF values. The VAF value was 78% indicating that organisational learning partially but strongly mediates the relationship between knowledge management and organisational performance. Therefore the influence of knowledge management on organisational performance is indirect because it is mediated by organisational learning. Therefore **H_2** which proposed that organisational learning mediates the relationship between knowledge management and organisational performance was confirmed.

5.2.3 The Hypothesized Moderating Effect of Organisational Characteristics on the Relationship between Knowledge Management and Organisational Performance

Objective three focused on determining whether organisational characteristics had a moderating influence on the relationship between knowledge management and organisational performance. The test for moderation was done in two stages where the moderating effect was tested for within the current model and subsequently the direct effect of organisational characteristics on organisational performance was also tested. The moderating results were as follows: $\beta = -0.050$, $P > 0.05$, $t = 0.663$, while $R^2 = 0.761$, $t = 10.54$, $P < 0.05$ and $f^2 = 0.014$. These results indicate that organisational characteristics have a negative and insignificant moderating effect on the relationship between knowledge management and organisational performance. Since the relationship is statistically insignificant **H_3** is not supported.

The analysis on the direct effect of organisational characteristics on organisational performance gives the following results: $\beta = 0.806$, $t = 18.020$, $P < 0.05$ and $f^2 = 01.848$.

The predictive power (R^2) results were: $R^2 = 0.649$, $t = 8.998$, $P < 0.05$. This means that organisational characteristics have a positive and statistically significant effect on organisational performance in a direct relationship.

5.2.4 The Complementary effect of Knowledge Management, Organisational Learning and Organisational Characteristics on Organisational Performance

The fourth objective involved determining whether the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance. To determine this, the models overall R^2 value was assessed and found to be 0.804. This indicates that the complementary effect of knowledge management, organisational learning and organisational characteristics contributes to 80.4 % of the variance in organisational performance. It is important to point out that in this model, the relationship between knowledge management and organisational performance is mediated by organisational learning.

The results of the current study signify that the complementary effect of all the exogenous constructs on organisational performance is greater than the individual effect of knowledge management on organisational performance. Knowledge management on its own results into an R^2 value of 0.641. This reveals that in a direct relationship between knowledge management and organisational performance, only 64% of the variance in organisational performance is explained by knowledge management on its own. The f^2 value and q^2 value results also support the conclusion that the complementary effect was greater than the effect of knowledge management alone on organisational performance. In conclusion the complementary effect of knowledge management, organisational learning, and organisational characteristics on organisational performance was greater than that of the individual effect of knowledge management on organisational performance. Hence **H_4** was confirmed.

The theory underpinning the findings in **H_4** is the theory of complementarities. This theory argues that an activity has higher returns when simultaneously combined with a complementary activity (Choi et al., 2008). In addition, the extant study findings support

the dynamic capabilities theory (Teece et al., 1997). Dynamic capabilities allude to the organisation's potential to change, develop or create the internal resources and capabilities that enhance its chances of survival but facilitates it to achieve a competitive edge above its competitors in a highly dynamic business environment. This is because as an organisation learns how to use resources to complement each other for improved results, it leads improvement in its capability to respond to the business environment which is very dynamic in nature.

5.3 Conclusion

The findings of the study led to conclusions based on the suppositions of the hypotheses. These conclusions are presented consequently. There is a relationship between knowledge management and organisational performance of companies listed on the Nairobi Securities exchange. The first hypothesis **(H_1)** proposed that there is a relationship between knowledge management and organisational performance in companies listed on the NSE. The results revealed a statistically significant relationship between knowledge management and organisational performance. Therefore **H_1** was confirmed. The study findings confirm that knowledge management is a very crucial factor that enhances organisational performance. Therefore in order to enhance performance, organisations should purposefully manage knowledge in terms of knowledge acquisition, knowledge sharing and knowledge application.

The study results revealed that organisational learning partially mediates the relationship between knowledge management and organisational performance in companies listed on the Nairobi Securities Exchange. The second hypothesis **(H_2)** proposed that organisational learning mediates the relationship between knowledge management and organisational performance in companies listed on the NSE. Results on tests of this hypothesis indicated a positive and statistically significant mediation effect. In addition the VAF test further revealed that the magnitude of mediation was 78%. This indicates that organisational learning partially but strongly mediates the relationship between knowledge management and organisational performance. This reveals that the effect of knowledge management on

organisational performance is an indirect one because it is strongly mediated by organisational learning. Therefore **H_2** was confirmed.

The study concluded that organisational characteristics did not moderate the relationship between knowledge management and organisational performance of companies listed on the NSE. Hypothesis three (H_3) proposed that organisational characteristics moderate the relationship between knowledge management and organisational performance in companies listed on the NSE. However, results revealed that the moderation effect was negative and statistically insignificant. Leading to a conclusion that organisational characteristics do not moderate the relationship between knowledge management and organisational performance. Therefore **H_3** was not supported.

Finally the study found that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance, was significantly greater than that of the individual effect of knowledge management on organisational performance, in companies listed on the NSE. **H_4** proposed that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is significantly greater than the individual effect of knowledge management on organisational performance. Therefore **H_4** was confirmed.

5.4 Contributions

In the last 20 years, knowledge management has grown from an emerging concept to an important function in business organisations. Consequently, a growing number of journals devoted to publication of papers on knowledge management and intellectual capital management have emerged. However knowledge management still remains a relatively new field in terms of published empirical research (Foss and Mahnke, 2003). Of the few knowledge management papers published most comprise conceptual studies and theoretical models. Existing empirical research on knowledge management over relies on a few published papers which mainly consist of descriptive, exploratory and qualitative case studies (Davenport and Prusak, 1998; Kalling, 2003; Massey et al., 2002; Nonaka, 1994).

The extant study has made significant contributions to HRM theories. The theories underpinning this study were the Theory of Complementarities, Organisational learning theory and RBV. It was also based on KBV and Dynamic Capabilities theory which are both extensions of RBV. Scholars have come to a consensus that knowledge has become a fundamental basis of competition (Zack 1999, Bhatti et al. 2011). They also agree that knowledge has to be managed. The main concern in knowledge management literature is the gap due to lack of large-scale empirical evidence that knowledge management makes a difference to organisational performance. There are very few empirical studies on the relationships between knowledge management and other organisational factors (Moffett et al., 2003). Of these only a few articles empirically interrogate the relationship between knowledge management and organisational performance. The current thesis adds to theory and empirical evidence that a statistically significant relationship exists between knowledge management and organisational performance in companies listed on the NSE.

A significant contribution of the extant study to the current body of knowledge in HRM concerns the complementary effect of knowledge management, organisation learning and organisational characteristic on organisational performance. The theory of complementarities posits that a system of complementary practices will lead to much more than the sum of it individual parts due to the synergy created by bundling of practices together. This will therefore result into enhanced competitive advantage and hence organisational performance. A majority of empirical studies in the past concentrated on the effect of individual constructs on organisational performance. The extant study adds a new dimension to the existing body of knowledge by providing empirical evidence that the complementary effect of knowledge management, organisational learning and organisational characteristics on organisational performance is greater than the individual effect of knowledge management, in companies listed on the NSE. Literature review did not yield evidence that such a study had been done previously.

In support of RBV, the complementary effect of the study's' constructs on performance was most likely as a result of increased competitive advantage due to the fact that complementary relationships are complex and causally ambiguous and therefore inimitable. This makes it very difficult for other organisations to understand and copy the specific ways in which the constructs have been used to complement each other towards

performance. Information about such combinations is considered to be firm specific and is only available to the specific firm therefore resulting into competitive advantage.

The study validates organisational learning theory and KBV by expanding on empirical studies on organisational learning theory, which conclude that organisational learning is crucial for organisational performance. The extant study found that in the complementary relationship among the three constructs (knowledge management, organisational learning and organisational characteristics), the most powerful predictor of organisational performance was organisational learning. This improves on organisation learning theory which holds that learning in an organisation enables better comprehension of the internal and the external environment of an organisation. This leads to fast response to a dynamic external environment and rapid adaptation of organisational behaviours, which contributes to improved competitive advantage and thus, organisational performance. It also found that the influence of knowledge management on organisational performance was strongly mediated by organisational learning.

The study added to empirical work showing that knowledge management was an important practice in organisations. Knowledge management was found to have a significant relationship with organisational performance. However, this relationship is an indirect one as it is mediated by organisational learning. The results of this study are generalizable across organisations especially in developing countries, because it was carried out in many different types of companies operating in the major sectors of the Kenyan economy. Similar studies in the past on the mediating role of knowledge management and organisational performance by Luxmi (2014) and Liao and Wu (2009), were not generalizable across companies and differing contextual settings as they were either carried out on limited numbers of organisations or very few sectors of the economy or very successful firms.

The study revealed that knowledge management made a large contribution to organisational learning which in turn resulted into organisational performance. KBV holds that knowledge assets results into long-term sustainable competitive advantage leading to organisational performance. This is due to the fact knowledge assets are valuable, socially complex and inimitable. In the study, organisational learning was found to be a strong mediator between knowledge management and organisational performance. This added to empirical evidence in line with organisational learning theory, which holds that acquisition

of knowledge leads to organisational learning and consequently to organisational performance. It also contributes to the KBV theory by virtue of the fact that knowledge management was one of the constructs.

The current study adds to the empirical studies that have used PLS-SEM approach. SEM is considered a second generation analytical tool which is an improvement of the first generation tools that were mainly regression based. The first generation analytical tools assume that data is error free while SEM recognizes the probability of error and makes an attempt to identify the error component in the measurement model. SEM also facilitates the analysis of relationships between multiple variables which include those that are observable and those that are implied from the observable ones.

In the analyses for mediation, SEM also improves on the methodology. In SEM, Hair et al., (2004) recommends a more comprehensive approach to mediation analysis because it not only tests for the presence or absence of mediation but also measures the magnitude of mediation in terms of Variance Accounted For (VAF). Many previous studies used step wise approach to test for mediation as recommended by Baron and Kenny (1986), which does not measure the magnitude of mediation. The current study uses the bootstrap approach to test whether the mediation relationship exists. Once a mediation relationship has been established, the VAF test was applied to determine the magnitude of mediation.

The study has contributed towards management practice of organisations because it gives empirical evidence that knowledge management and organisational learning are very important in any organisation seeking to improve performance. In their effort to improve organisational performance, managers should purpose to improve knowledge management and organisational learning. Therefore managers can use this study as a foundation to argue for the conscious and purposeful practice of knowledge management and organisational learning in organisations. This would then enhance organisational performance. Policy makers in organisations will also benefit from this study because it provides empirical evidence that knowledge management and organisational learning are very important for performance. It makes a strong basis for policy makers to come up with policies that will facilitate both knowledge management and organisational learning.

5.5 Recommendations

The direct effect between knowledge management and organisational performance was found to be positive and statistically significant. In view of this the study recommends that organisations employ and enhance knowledge management because it enhances not only organisational learning, but also organisational performance. In the same vein organisational learning was found to be a strong mediator in the relationship between knowledge management and organisational performance. This led to the conclusion that the influence of knowledge management on organisational performance is not direct, it is indirect. Therefore for knowledge management to have maximum effect on organisational performance, organisational learning should be enhanced.

In view of the results on the aforementioned mediation role of organisational learning, this study recommends that knowledge management be employed as an integral part of organisational learning towards improved organisational performance. Organisations should therefore come up with policy on knowledge management and organisational learning to enhance operational efficiency. This process should start by carrying out an audit on the knowledge held by the organisation members. This policy could include organisational and personal training on knowledge management to facilitate continued organisational learning towards improved organisational performance. The policy could make clear how knowledge can be acquired, shared and applied.

The extant study found that the complementary effect of knowledge management, organisational learning and organisational characteristics will lead to better organisational performance as compared to knowledge management on its own. In view of this, the current study recommends that managers find the most effective way to use knowledge management, organisational learning and organisational characteristics as complements of each other so as to gain competitive advantage leading to enhanced organisational performance.

5.6 Limitations of the Study

In the course of the research process the researcher experienced some limitations. However, these did not cause significant interference with the outcome of the study. The geographical spread of the organisations was a major hurdle. Most of the organisations are spread over and across various towns in Kenya including Nairobi, Mumias, Thika, Ruiru. and Athi River, while one is in Uganda. Given that the study was a census of all the organisations listed on the NSE, it was a major challenge to access the organisations and this caused a major delay in completing the data collection process. In addition, the data collection process was extremely expensive especially because the researcher did not receive any funding grant to facilitate the process.

Data was collected from one manager from each organisation. These managers were drawn from various departments and included Human resource managers, ICT managers, Finance managers, General Managers, and Operation Managers among others. Though the respondents were expected to give objective responses, the fact that they were from different departments may have led to differences in the way they responded to questionnaire items due to differences in their work which could lead to differing perceptions.

The use of the likert scale also enables respondents who do not read the questionnaire to answer it by just ticking through the answers without reading. In the current study one questionnaire was rejected when the respondent gave the scale number five as a response for almost all the questions.

The response rate could have been better had all the managers been cooperative. A few companies refused to participate at all while in some others the questionnaire was not returned. The researcher eventually had to give up after numerous attempts to collect the filled questionnaire failed. This led to a lot of waste in terms of the limited time and funds available for data collection. However these companies were very few and the response rate was high. Therefore this did not affect the results of the study adversely as the response rate was high.

5.7 Suggestions for Further Research

This study involved only the companies listed on the NSE in Kenya. This represents most of the sectors of the Kenyan economy and consists of medium and large organisations of the Kenyan economy. Future research could widen the scope and carry out a study including the East African region.

The moderating construct was operationalized into human capital, IT capability and culture as organisational characteristics. This construct was found to have a negative but statistically insignificant moderating effect on the relationship between knowledge management and organisational performance. This finding was unexpected since the characteristics are considered to be enablers of knowledge management. In an effort to gain in-depth empirical evidence or validation, this study recommends that similar studies are done considering each of the factors in organisational characteristics namely culture, human capital and IT capability individually as moderators in the relationship between knowledge management and organisational performance.

This study used a cross-sectional design. This may have led to the failure of the financial performance measure in terms of reliability. Future research could use the longitudinal research design which would improve on the data for financial management. This study employed the use of Return on Assets (ROA) to measure financial performance. Future research could make use of more measures of financial performance as opposed to a single measure.

REFERENCES

Africa Economic Outlook (2015). *Kenya economic survey* 2014. UNDP

Alavi, M., & Leidner, D. E. (2001). Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25(1), 107-136.

Aldisent, L. (2002). *Valuing People! How Human Capital Can Be Your Strongest Asset*. Chicago, IL: Dearborn Trade Publishing.

Ali, F. & Cobanoglu, C. (2016). *Using Structural Equation Modeling (SEM), Using Partial Least Squares (Smart PLS*): SmartPLS Webinar. Association of North America Higher Education International.

Allame, S. M., Nouri, B. A., Tavakoli, S. Y., & Shokrani, S. A. (2011). Effect of Organisational Culture on Success of Knowledge Management system's implementation (Case Study: Saderat bank in Isfahan province). *Interdisciplinary Journal of Contemporary Research in Business,* 2 (9), 321-346.

Ambula, R. (2015). Learning Organization, Knowledge Management, Employee Outcomes And Performance Of Large Manufacturing Firms in Kenya. *Unpublished PhD Thesis*, University of Nairobi.

Anderson, J. C. & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103, (3),411-423

Annette M. M. & Trevor, A. S. (2011). Knowledge management and Organisational Performance: a decomposed view. *Journal of Knowledge Management*, 15(1), 156-171.

Argote, L., & Ingram, P. (2000). Knowledge transfer in organizations: a basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes*, 82:150-169

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94.

Balta, M. E. (2008). *The Impact of Business Environment and Boards of Directors on Strategic Decision Making*: *A Case Study of Greek Listed Companies*, (Unpublished PhD Thesis). Brunei Business School.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99-120.

Baron, R. & Kenny, D. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.

Bartlett, J. E., Kotrlik, J. W. and Higgins, C.C. (2001) Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal*, 19, 43-50.

Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations, 61*(8), 1139–1160.

Bhatti, W. A., Khan, M. N., Ahmad, A., Hussain, N., & Rehma, K. (2011). Sustaining competitive advantage through effective knowledge management. *African Journal of Business Management*, 5(7), 2847-2853.

Bhatti, W. A., Zaheer, A., & Kashif, U. R. (2010). *The effect of knowledge management practices on Organisational Performance a conceptual study*. Iqra University, Islamabad, Pakistan.

Bierly, P., & Chakrabarti, A. (1996). Generic knowledge strategies in the US Pharmaceutical industry. *Strategic Management Journal*, 17 (Winter Special Issue) 123–135.

Black, S. E., Lynch, L. M. (2001). How to compete: the impact of workplace practices and information technology on productivity. *Review of Economics and Statistics*, 83(3), 434–445.

Blanchard, P., & Thacker, J. (2009). *Effective training: Systems strategies and practices*. In (4th ed.), Learning, motivation, and performance (p. 58-90). New Jersey: Prentice Hall.

Bollen, K. A.,&: Stine, R. A. (1990). Direct and Indirect Effects: Classical and Bootstrap Estimates of Variability. *Sociological Methodology*, 20, 115-140.

Bontis, N. (1999) Managing organisational knowledge by diagnosing intellectual capital: Framing and advancing the state of the field. *International Journal of Management Review*, 18(5), 433–462.

Bontis, N. (2001). Assessing knowledge assets: A review of the models used to measure intellectual capital. *International Journal of Management Review*, 3(1), 41–60.

Bontis, N. (2002). *World Congress of Intellectual Capital Readings*, Elsevier Butterworth-Heinemann KMCI Press, Boston, MA.

Bontis, N., M. Crossan, & J. Hulland (2001). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, forthcoming.

Borsboom, D.; Mellenbergh, G.J.; van Heerden, J. (2004). The Concept of Validity.

Bresnahan, T., Brynjolfsson E, & Lorin, M. H. (2002). Information technology, workplace organisation, and the demand for skilled labor: firm-level evidence. *Quarterly Journal of Economics,*117(1), 339–376.

Bryman, A., & Cramer, D. (2005). *Quantitative Data Analysis with SPSS 12 and 13*. Routledge: London.

Bryman, A., & Bell, E. (2003). *Business research methods*. Oxford, UK: Oxford: University Press.

Busienei, J. R. (2013). Effect of Business Strategy and Organizational Structure on the Relationship between Human Resource Strategic Orientation and Performance of Private Manufacturing Firms in Kenya. (*Unpublished PhD Thesis*)- University of Nairobi.

Cabrita, R., & Bontis, N. (2008). Intellectual capital and business performance in Portuguese banking industry. *International Journal of Technology Management*, 43, 212-237.

Cameron, K. S. & Quinn, R. E. (1999). *Diagnosing and Changing Organisational Culture*. OD Series, Addison-Wesley.

Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and Changing Organisational Culture, a revised edition.* Jossey-Bass; A Wiley Imprint.

Cavaleri, S. A. (2004). Leveraging Organisational learning for knowledge and performance. *The Learning Organisation*, 11 (2), 159-76.

Cavanagh S. (1997) Content analysis: concepts, methods and applications. *Nurse Researcher* 4, 5–16.

Chattel, A. (1998). *Creating Value in the Digital Era*. Macmillan, London.

Chen, C. J., Huang, J. W., & Hsiao, Y. C. (2010). Knowledge management and innovativeness: The role of organisational climate and structure. *International Journal of Manpower*, 31(8), 848-870.

Cherrington, D. J. (1991). *The Management of Human Resources* (Boston, Mass, Allyn and Bacon.

Chin, W. W. (1998b). *The Partial Least Squares Approach to Structural Equation Modeling*, in Modern Methods for Business Research, G. A. Marcoulides (ed.), Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 295-336.

Chin, W. W. (2010). *How to Write Up and report PLS Analyses*, in Handbook of Partial Least Squares, V. E. Vinzi, W. W. Chin, J. Henseler, and H. Wang (eds.), Berlin: Springer-Verlag, 655-690.

Chin, W. W., & Newsted, P. R. (1999). *Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares,* in Statistical Strategies for Small Sample Research, Rick Hoyle (ed.), Thousand Oaks, CA: Sage Publications, 307-341.

Choi, B., Poon, S.K., & Davis, J.G. (2008). Effects of knowledge management strategy on organisational performance: A complementarity theory-based approach. *The International Journal of Management Science,* 36, 235-251.

Chuang, S. (2004). A Resource Based Perspective on Knowledge Management Capability and Competitive Advantage: An Empirical Investigation. *Expert Systems with Application*, 27 (3), 459-465.

Clemons, E. K. (1991). Information Systems for Sustainable Competitive Advantage. *Information &Management,* 24(11), 23-32.

Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23 (3), 239-290.

Comte, A. & Bridges, J. H. (2009), *A General View of Positivism*; Trubner and Co., 1865 (reissued by Cambridge University Press).

Connor, T. (2002). The resource based view of strategy and its value to practicing managers. *Strategic Change* 25, June, Wiley Interscience.

Cooper, D. R., & Schindler, P. S. (2006). *Business Research Methods* (9th edition), USA: McGraw-Hill.

Cooper, D. R., & Schindler, P.S. (2008). *Business research methods.* 10th Edition, McGraw-Hill Higher Education.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16(3), 297–334.

Crook, S. C. (1993). Turning Point: Survey of the Japanese Economy. *The Economist,* 326 (7801), 56.

Danish, R. Q., Munir, Y., & Din Butt, S. S. (2012). Moderating Role of Organisational Culture between Knowledge Management and Organisational Effectiveness in Service Sector. *World Applied Science Journal,* 20 (1), 45-53.

Davenport, T. & Prusak, L. (1998). *Working Knowledge: How Organisations Manage What They Know*. Harvard Business School Press, Boston.

Davenport, T. & Prusak, L. (2000). *Working Knowledge: How Organisations Manage What They Know*. Harvard Business School Press. Boston: Massachusetts.

Denison, D. R. (1990). *Corporate Culture and Organisational Effectiveness*. New York: John Wiley & Sons.

Despres, C., & Chauvel, D. (2000). *Knowledge horizons,* Oxford: Butterworth-Heinemann.

Dess, G., & Shaw, J.D. (2001). Voluntary turnover, social capital, and organizational performance. *The Academy of Management Review,* 26, 446-57.

Devaraj, S., & Kohli, R. (2003). Performance impacts of information technology: Is actual usage the missing link*? Management Science,* 49(3), 273-289.

Dietrickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science,* 35 (12), 1504-1511.

Dijkstra, T. K. (2010). *Latent Variables and Indices: Herman Wold's Basic Design and Partial Least Squares. SNS Asset Management, Research and Development*. Groningen, The Netherlands.

Dimovski, V. (1994). *Organisational learning and Competitive Advantage*. Cleveland: PhD Thesis.

Dixon, N. (1999). *The Organisational learning Cycle: How We Can Learn Collectively*. Gower, England.

Dougherty, D, Barnard, H. & Dunne, D. (2004) *Exploring the everyday dynamics of dynamic capabilities.* In Third Annual MIT/UCI Knowledge and Organisations Conference, Laguna Beach, CA. March 5–7.

Ducharme, L. (1998), *Measuring Intangible Investment: Main Theories and Concepts*, OECD, Paris.

Edgeworth, F. Y. (1926). *Mathematical psychics: an essay on the application of mathematics to the moral sciences*. London: Kegan Paul; 1881, In Vives, X. (1993), Edgeworth and modern oligopoly theory, *European Economic Review* 37(1993) 463476. North-Holland.

Edvinsson, L. & Malone, M. (1997). *Intellectual Capital*. New York, Harper Business.

Edwards J. Bagozzi R. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods*; 5(2): 155-174.

Eisenhardt, K. M. & Martin, J. A., (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21 (10/11), 1105-1122.

Eisenhardt, K. M., & Santos, F. M. (2002). *Knowledge-based view: A new theory of strategy?* In Pettigrew, A., Thomas, H. and Whittington, r. (Eds.) Handbook of Strategy and Management, Sage Publications.

Eriksen, J. (2005). *The influences of organisational design on strategy and performance – The case of exploration and exploitation*, Paper presented at the Workshop on organisational design, EIASM-BRUSSELS, March 7-8.

Ferran-Urdaneta, C. (1999). *Teams or Communities, Proceedings of the 1999 ACM SIGCPR Conference on Computer Personnel Research*. April 8-10, New Orleans: LA.

Fiol, M., & Lyles, M. (1985). Organisational learning. *Academy of Management Review*, 10(4), 803-813.

Firestone, J. M., & McElroy, M. W. (2004). Organisational learning and knowledge management: the relationship. *The Learning Organisation*, 11(2), 177-84.

Foray, D. (2004). *The economics of knowledge*. MIT Press, Cambridge: Gilford, 1979.

Forghani, M. A., & Tavasoli, A. (2017). Investigating the relationship between knowledge management and organisational performance in lean manufacturing. *International Journal of Management, Accounting and Economics,* 4 (3), 218-226.

Fornell, C., & Larcker, D.F. (1981). Evaluating Structural Equations Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18(1), 39-50.

Foss, N. J. (2005). *Strategy, economic organisation and the knowledge economy, The Coordination of firms and resources,* Oxford University Press, Oxford.

Foss, N. J., & Mahnke, V. (2003). *Knowledge management: what can organisational economics contribute?,* in Easterby-Smith, M. and Lyles, M.A. (Eds), The Blackwell Handbook of Organisational learning and Knowledge Management, Blackwell Publishing, Oxford: 78-103.

Fuglesth, A. M., & Gronhaug, K. (2003). Tool Kit for Measurement of Organisational learning: Methodological Requirements and an Illustrative Example. *Journal of Universal Computer Science, 9*, (12), 1487-1514.

Garson, G. D. (2016). *Partial Least Squares: Regression and Structural Equation Models.* Statistical Associates Publishing, Asheboro USA.

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS Graph: tutorial and annotated example. *Communications of the AIS*, 16, 91-109.

Gefen, D., Straub, D. & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice, *Communications of the AIS*, 4 (7), 1-77.

Geisser, S. (1975). The predictive sample reuse method with applications. *Journal of the American Statistical Association*, 70(350), 320–328.

Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organisational ambidexterity. *Academy of Management Journal,* 47(2), 209–226.

Gilliam, D. A., & Voss, K. (2013). A Proposed Procedure for Construct Definition in Marketing. *European Journal of Marketing*, 47(1/2), 5-26.

Glynn, M. A., Lant, T. K., & Milliken, F. J. (1994). *Mapping learning processes in organisations: A multi-level framework for linking learning and organizing. Advances in Managerial Cognition and Organisational Information Processing*, Vol. 5. JAI Press, Greenwich, CT, 43–83.

Gold, A.H., Malhotra, A., & Segars, A.H. (2001). Knowledge management: An organisational capabilities perspective. *Journal of Management Information Systems*. 18 (1), 185-214.

Gorelick, C. & Tantawy-Monsou B. (2005). For performance through learning, knowledge management is critical practice. *The Learning Organisation*, 12(2),125-139.

Grant, R. (1996a). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science,* 7 (4), 375-387.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management*

Grant, R. M. (1996b). Towards a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17, Winter Special Issue, 109-122.

Gray, P. H. & Durcokova, A. (2005). The role of knowledge repositories in technical

Hair, J. E,. Tomas, G. H., Ringle C. M., & Sarstedt, M., Hatch, N. W., & Dyer, J. H. (2004). *A Primer on Partial Least squares Structural Equation Modeling* (PLS-SEM), Sage, Los Angeles.

Hair, J. F., Hult, G. T.M., Ringle, C.M., & Sarstedt, M. (2017*). A primer on partial least squares structural equation modeling* (PLS-SEM) (2nd ed.). Thousand Oaks, CA: Sage.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice,* 19(2), 139–151.

Hair, J. F., Sarstedt, M., Ringle, C.M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40(3), 414–433.

Hamid, A. Z. (2008). Identifying Knowledge and Creating Knowledgeable Employees. *Journal of Knowledge Management Practice* 9(2)

Hansen, M., Nohria, N., & Tierney, T. (1998). What is your strategy for managing knowledge. *Harvard School of Business Review*, 77(2) 327-351.

Harung, H. S., Heaton, D. P., & Alexander, C. N. (1999). Evolution of organisations in the new millennium. *Leadership and organization development journal*, 20 (4) 198-207.

Hashim, K. F. (2012). *Understanding the determinants of contnuous knowledge sharing intentention within business online communities*. Auckland University of Technology.

Hatch, W. N., & Dyer, H. J. (2004). Human Capital and learning as a source of competitive advantage. *Strategic Management Journal*, 25, 1155-1178.

Heaton, D. P., & Harung, H. S. (1999). The conscious organization. *The Learning Organization*, 6, (4), 157-62.

Henseler, J. and Chin, W.W. (2010), "A comparison of approaches for the analysis of interaction effects between latent variables using partial least squares path modeling", Structural Equation Modeling: *A Multidisciplinary Journal*, 17(1), 82-109.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, 116 (1), 2-20.

Henseler, J., Ringle, C.M. & Sarstedt, M. (2012), *Using partial least squares path modeling in international advertising research: basic concepts and recent issues*, in Okazaki, S. (Ed.), Handbook of Research in International Advertising, Edward Elgar Publishing, Cheltenham, pp. 252-276.

Henseler, J., Ringle, C.M. & Sarstedt, M. (2015), A new criterion for assessing discriminant validity in variance-based structural equation modeling, *Journal of the Academy of Marketing Science*, 43 (1), 115-135.

Henseler, J., Ringle, C.M. & Sarstedt, M. (2016), Examining the measurement invariance of composite models using variance-based structural equation modeling, *International Marketing Review*, 33 (3).

Hitt, L. M., & Brynjolfsson, E. (1996). Productivity, business profitability, and consumer surplus: three different measures of information technology value. *MIS Quarterly* 20(2) 121-142.

Hitt, M. A., Bierman, L., Shimizu, K., & Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. *Academy of Management Journal*, 44 (1), 13-28.

Huber, G. P. (1991). Organisational learning: The contributing process and the literatures. *Organisation Science*, 2 (1), 88-115.

Husserl, E. (1970). *Logical investigations.* New York: Humanities Press.

Inkpen, A. C. (2000). Learning through joint venture: A framework of knowledge acquisition, *Journal of Management Studies*, 37(7), 1019-1043.

Jarvis, C.B., Mackenzie, S.B., & Podsakoff, P.M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of consumer research*. 30(2), 199-218.

Johannessen, J., & Olsen, B. (2003). Knowledge management and sustainable competitive advantages: The impact of dynamic contextual training. *International Journal of Information Management*, 23, 277–289.

Kalling, T. (2003). Knowledge Management and the Occasional Links with Performance. *Journal of Knowledge Management*, 7 (3), 67-81.

Kaplan, R., & Norton, D. (2004). Measuring the strategic readiness of intangible assets. *Harvard Business Review*, Boston: MA, Harvard Business School Press. p. 52-60.

Keen, P. (1993). Information technology and the management difference: a fusion map. *IBM Systems Journal*, 32 (1), 17.

Kenya National Bureau of Statistics, (2007). Economic survey.

Khandekar. A., & Sharma, A. (2006). Oganizational learning and performance: Understanding Indian scenario in present global context. *Education and Training* 48, 682-692.

Kidombo, H. J. (2007). Human Resource Strategic Orientation, Organizational Commitment and Firm Performance in Large Private, Manufacturing Firms in Kenya: *Unpublished Ph.D Thesis,* University of Nairobi, School of Business.

King, G, Keohane, R.O. & Verba, S. (1994). *Designing Social Inquiry*. Chichester: Princeton University Press.

Kline, R. (2011). *Principles and practice of structural equation modeling. New York*: The Guilford Press.

Koch, M. J., & McGrath, R. G. (1996). Improving labor productivity: Human resource management policies do matter. *Strategic Management Journal*, 17, 335–354.

Kolb, D. A. (1984).*Experiential Learning. Experience as the Source of Learning and Development.* Prentice-Hall Enlewood cliffs N. J.

KPMG Management Consulting (1998). *The Knowledge Management Research Report,* A survey of 100 European Companies by the Harris Research Center.

Kyongo, J. K. (2016), Management Competence, Firm-Level Institutions, Human Resource Management Bundles And Performance Of Companies Listed On The Nairobi Securities Exchange. *Unpublished PhD Thesis*, University of Nairobi.

Lai, Y. (2013). The moderating effect of organisational structure in knowledge management for international ports in Taiwan. *International Journal of Computer and Information Technology* (ISSN: 2279 – 0764) 02(02).

Lee, H. & Choi, B. (2003). Knowledge management enablers, processes and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems,* 20(1), 179-228.

Letting, N. K. (2011). *Board of directors attributes, strategic decision-making and corporate performance of firms listed on the Nairobi Stock Exchange.* (Unpublished PhD Thesis), UON.

Levinthal & March (1993). Myopia of Learning. *Strategic Management Journal,* 14 (S2), 95-112.

Liao, S., & Wu, C. (2009). The relationship among knowledge management, Organisational learning, and organisational performance. *International Journal of business management,* 4(4), 47-76.

Lopez, S. P., Peon, M. M., & Ordas, V.J. (2005). Organizational learning as a determining factor in business performance. *The Learning Organization*. 12(3), 227-245.

Lunenburg, F. C. (2012). Mechanistic-organic organizations—an axiomatic theory: authority based on bureaucracy or professional norms. *International Journal of Scholarly Academic Intellectual Diversity*, 14 (1), 1-7.

Luxmi. (2014). Organisational learning Act as a Mediator between the Relationship of Knowledge Management and Organisational Performance. *Management and Labour Studies*, 1, 31-41.

Malhotra, Y. (2003). Is Knowledge The Ultimate Competitive Advantage? An Interview of Dr. Yogesh Malhotra, Bus. Manage. Asia, September, 66-69.

Malhotra, Y. (2005). An Interview of Dr Yogesh Malhotra by Alistair Craven, Manage. First, http://first.emeraldinsight.com April 2.

Mata, F. J., Fuerst W. L., & Barney J. B. (1995). Information technology and sustained competitive advantage: a resource-based analysis. *MIS Quarterly*, 19 (4), 487–504.

McGill, M. E., & Slocum, J. W. (1994). *The smarter organization: How to build a business that learns and adapts to marketplace*. New York, NY: John Wiley & Sons.

Mels, B. (2010). *Designing a Balanced Scorecard (BSC) for a mining supply company*. A Thesis submitted in North-West University.

Milgrom, J., & Roberts P. J. (1995). Complementarities of fit: strategy, structure, and organisational change. *Journal of Accounting and Economics*; 19, 179–208.

Miller, D., & Droge, (1986). Psychological and traditional determinants of structure. *Administrative Science Quarterly*, 31 (4), 539-560.

Mills, A. M., & Smith, T. A (2011). Knowledge management and organisational performance: a decomposed view, *Journal of Knowledge Management*, 15(1),156 – 171.

Moffett, S., R. McAdam, & Parkinson, S. (2003). an empirical analysis of knowledge management applications. *Journal of Knowledge Management,* 7 (3), 6-26.

Morton, K. (1995). The irony of service: Charity, projects and social change in service learning. *Michigan Journal of Community Service Learning, 2*, 19-32.

Nahm, A. Y., Vonderembse, M. A., & Koufteros, X. A. (2003). The impact of organisational structure on time-based manufacturing and plant performance. *Journal of Operations management*, 21(3), 281–306.

Nairobi Securities Exchange (2014), Annual report and financial statement.

Nairobi Securities Exchange (2015-2017), Investors Handbook,

Nelson, R., & Winter, S. (1982). *An evolutionary theory of economic change*. Harvard University Press, Cambridge, Ma.

Nielsen, A. P. (2006). Understanding dynamic capabilities through knowledge management. *Journal of Knowledge Management*, 10 (4), 59-71.

Noe, R. (2008). *Employee training and development*. New York: McGraw-Hill/Irwin.

Norton, D. & Kaplan, R. (1996). *The Balanced Scorecard: Translating Strategy into Action. MA: Harvard Business School.*

Noruzy, A., Dalfard, V. M., Azhdari, B., Nazari-Shirkouhi, S., & Aliasghar Rezazadeh. (2013). Relations between transformational leadership, Organisational learning, knowledge, organisational innovation, and organisational performance: an empirical investigation of manufacturing firms. *The International Journal of Advanced Manufacturing Technology,* 64, 1073-1085.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw- Hill.

O'Dell , C., & Grayson, C. J. (1998). If only we knew what we know: The transfer of internal knowledge and best practice. *Journal of Management Studies,* 47 (6), 1154-1191.

OECD. (2005). OECD Science, Technology and Industry Scoreboard 2005. Executive Summary [webdocument]. Available at: http://www.oecd.org/dataoecd/59/52/35465901.pdf.

Olejnik, S. & Algina, J. (2003). Generalized eta and omega squared statistics: measures of effect size for some common research designs. *Psychological Methods*, 8, (4), 434-447.

Olweny, T. O., & Kimani, D. (2011). Stock market performance and economic growth. empirical evidence from Kenya using causality test approach. *Advances in Management and Applied Economics,* 1 (3) 153-196.

Ongore, V. K. (2008). *The effects of ownership structure, board effectiveness and managerial discretion on performance of listed companies*. (Unpublished PhD Thesis).School of Business, University of Nairobi.

Pardo, A., & Roman, M. (2013). Reflections on Baron and Kenny model of statistical mediation. *Anales de psicologia*, 29(2), 614-623.

Pemberton, J. D. & Stonehouse, G. H. (2000). Organisational learning and knowledge assets: An essential partnership. *The Learning Organisation*, 7(4), 184–193.

Penrose, E. (1959). *The theory of the growth of the firm*. Blackwell, Oxford.

Pettigrew, H. T., & Whittington, R. (2001). *Handbook of strategy and management*. Thousand Oaks, CA: Sage.

Pilar, J. G,. Jose, C. L., & Ramon V. C. (2005). Organisational learning capability: A proposal of measurement. *Journal of Business Research*, 58(6), 715–725.

Prahalad, C. K. & Hamel, C. (1990). The core competence of the corporation. *Havard Business Review,* 68 (3), 79-91.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717-731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in simple and multiple mediator models. *Behavior Research Methods*, 40, 879-891.

Price Water House Coopers and World Economic Forum (1999). *Inside the Mind of the CEO.* The 1999 Global CEO Survey.

Priem, R. L. & Butler J. E. (2001). Is the resource-based view a useful perspective for strategic management research?. *Academy of Management Review* 26(1), 22–40.
Psychological Review, 111(4), 1061-1071.

Rasula, J., Vuksic, V. B., & Stemberger, M. I. (2012). The Impact of Knowledge Management on Organisational Performance. *Economic Business Review*, 14, (2), 147-168.

Ray, G., Barney, J. B. & Muhanna, W. A. (2004). Capabilities, Business Processes, and Competitive Advantage: Choosing the Dependent Variable in Empirical Tests of the Resource-based View. *Strategic Management Journal*, 25, 23-37.

Reychav, I., & Weisberg, J. (2010). Bridging intention and behavior of knowledge sharing, *Journal of Knowledge Management*, 14(2), 285-230.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnstone, G. (2009). Measuring Organisational Performance: Towards Methodological Best practices. *Journal of Management*, 35(3), 718-804.

Rigdon, E. E. (1998). *Structural Equation Modeling*. In GA Marcoulides (ed.), Modern Methods for Business Research, pp. 251–294. Lawrence Erlbaum Association, London.

Rigdon, E. E. (2012). Rethinking partial least squares path modelling: in praise of simple methods. *Long range planning,* 45: 5-6 pp. 341-358.

Rowley, J. (2006) Customer Knowledge Management, *Academy of Management.* Best Papers Proceedings.

Sadler, P. (1994) 'Simple Minds', *QED, BBC2,* 19 September.

Sarstedt, M. & Mooi, E. A. (2014). *A concise guide to market research. The process, data, and methods using IBM SPSS Statistics*. Berlin: Springer.

Sarstedt, M., Ringle, C. M., Smith, D., & Hair, J. F. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM): A Useful Tool for Family Business Researchers. *Journal of Family Business Strategy* 5(1),105-115.

Sarvary, M. (1999). Knowledge management and competition in the consulting industry. *California Management Review*, 41(2):95–107.

Schein, E. H. (1999). Empowerment, coercive persuasion and Organisational learning: Do they connect? *The learning organization,* 6 (4) 163-72.

Schreyögg, G., & Sydow, J. (2010). Organising for fluidity? Dilemmas of new organisational forms. *Organisation Science*, 21(6), 1251–1262.

Seleim, A., Ashour, A. & Bontis, N. D. (2007). Human capital and organizational performance: a study of Egyptian software companies. *Management Decision*, 45 (4), 789-801.

Senge, P. (1990). *The Fifth Discipline – The Art and Practice of The Learning Organisation*. New York: Doublebay.

Seubert, E., Balaji, Y., & Makhija, M. (2001). The Knowledge Imperative. *CIO Special Advertising Supplement*, March 15.

Shabarati, A., Jawad, J., & Bontis, N. (2010). Intellectual capital and business performance in pharmaceutical sector of Jordan. *Management Decision Journal*, 48 (1), 105-131.

Sheng, C., & Tian, Y. (2010). Relationships among teamwork behaviour, trust, perceived team support, and team commitment. *Social Behaviour and Personality*, 38(10), 1297–1306.

Sherif, K., Hoffman, J., & Thomas, B. (2006). Can technology build organisational social capital? The case of a global IT consulting firm. *Information and Management*, 43, 795–804.

Shrout, P. E., &: Bolger, N. (2002). Mediation in Experimental and Non-Experimental Studies: New Procedures and Recommendations. *Psychological Methods*, 7, 422-445.

Spender, J. C. & Grant, R. M. (eds.) (1996), Knowledge and the Firm, Special Issue *Strategic Management Journal*, 17 (2).

Spender, J. C. (1996a). Organizational knowledge, learning and memory: Three concepts in search of a theory. *Journal of Organizational Change*, 9(1), 63-78.

Spender, J. C. (1996b). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17, 45-62.

Stoyko, P. (2009). *Organisational Culture and the Management of Organisational Memory*. Canada School of Public Service, Canada.

Su, K. J., Huang, L. C., & Hsieh, H. L. (2004). *The development of a knowledge flow paradigm in engineering education: Empirical research in Taiwanese universities*. World Transactions on Engineering and Technology Education, 3(1), 125–128.

Tayles, M., Pike, R.H., & Sofian, S. (2007). Intellectual capital, management accounting practices and corporate performance. *Accounting, Auditing & Accountability Journal*, 20(4) 522-548.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management *Strategic Management Journal* , 18 (7) 509-533.

Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganisational linkages: an institutional perspective. *MIS Quarterly*, 27(1), 19–49.

Tsang, E. W. K. (1997). Organisational learning and the learning organisation: a dichotomy between the descriptive and prescriptive research. *Human relations*, 50 (1), 73-89.

Turyasingura, W. (2011). *Interdependency of Knowledge Management and Organisational learning: The Case of Higher Education Institutions in Uganda.* A Doctoral thesis in the University of Witwatersrand.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*; Cambridge University Press.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.

Wheeler, B. C. (2002). A dynamic capabilities theory for assessing net-enablement. *Information Systems Research*, 13(2), 125-146.

Wheeler, B. C., & Valacich, J. S. (1996). Facilitation, GSS, and training as sources of process restrictiveness and guidance for structured group decision making: an empirical assessment. *Information Systems Research* 7 (4), 429-450.

Wickens, M. R. (1972). A note on the use of proxy variables. *Economatrica*, 40(4), 759-761

Wiklund, J. & Shepherd, D. (2003). Knowledge-based Resources, Entrepreneurial Orientation and the Performance of Small and Medium-sized Businesses. *Strategic Management Journal*, 24, 1307-1314.

Winter, S. G., (2003). Understanding dynamic capabilities. *Strategic Management Journal.* 24 (10), 991-995.

Wong, K. K. (2015). *Mediation analysis, categorical moderation analysis, and higher order constructs modeling in partial least squares structural equation modeling (PLS- SEM). A B2B example using Smart PLS*. Unpublished Manuscript.

Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young, technology-based firms. *Strategic Management Journal*, 22, 587-613.

Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review* 41(3), 125–145.

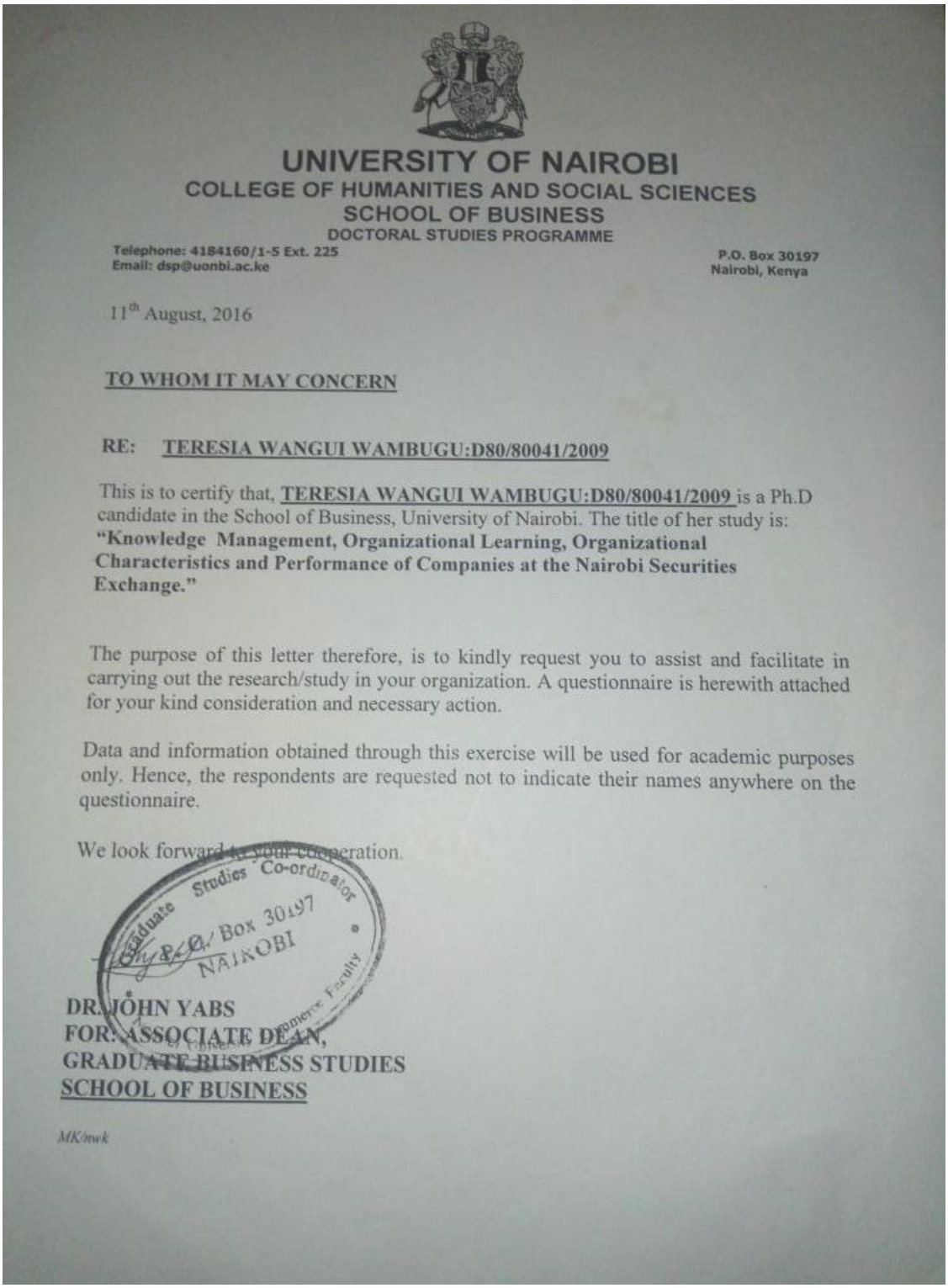
Zack, M., J. Mckeen & S. Singh (2009), Knowledge management and organizational performance: An exploratory analysis. *Journal of Knowledge Management*, 13 (6), 392-409.

Zeleny. M., Comet, R. J., & Stoner, J. A. F. (1990). moving from the age of specialization to the era of integration. *Human System Management*. 9, 153- 17.

Zollo, M., & Winter, S. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organisation Science*, 13, 339–351.

APPENDICES

Appendix I: Letter of Introduction



UNIVERSITY OF NAIROBI
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Nairobi, Kenya

11th August, 2016

TO WHOM IT MAY CONCERN

RE: TERESIA WANGUI WAMBUGU:D80/80041/2009

This is to certify that, **TERESIA WANGUI WAMBUGU:D80/80041/2009** is a Ph.D candidate in the School of Business, University of Nairobi. The title of her study is: **"Knowledge Management, Organizational Learning, Organizational Characteristics and Performance of Companies at the Nairobi Securities Exchange."**

The purpose of this letter therefore, is to kindly request you to assist and facilitate in carrying out the research/study in your organization. A questionnaire is herewith attached for your kind consideration and necessary action.

Data and information obtained through this exercise will be used for academic purposes only. Hence, the respondents are requested not to indicate their names anywhere on the questionnaire.

We look forward to your cooperation.

Graduate Studies Co-ordinator
P.O. Box 30197
NAIROBI
Commerce Faculty

DR. JOHN YABS
FOR: ASSOCIATE DEAN,
GRADUATE BUSINESS STUDIES
SCHOOL OF BUSINESS

MKinwk

Appendix II: Research Questionnaire

Introduction

This questionnaire aims to collect data on Knowledge Management, Organisational Learning, Organisational Characteristics and the performance of companies listed at the Nairobi Securities exchange for a PhD Thesis. You are kindly requested to participate in the study by responding to the items given in the various sections as indicated. There is no right or wrong answers to the questions. We are interested in your general assessment. The information provided shall be used for academic purpose only. Your participation in facilitating the study is highly appreciated. The information provided will be treated with utmost confidentiality.

SECTION ONE: GENERAL INFORMATION

a) RESPONDENTS INFORMATION

1) Title/designation……..

2) How many years have you worked in this company (Please tick One)

Less than 10 years [ ]
11-15 years [ ]
16-20 years [ ]
21-25 years [ ]
26-30 years [ ]
Over 31 years [ ]

b) DEMOGRAPHICS CHARACTERISTICS OF EMPLOYEES

Please provide some information regarding employee's personal demographic characteristics.

1. How many full time employees are currently employed in your organisation?

1 to 49	[ ]	Between 50-499	[ ]
Below 500	[ ]	Between 501-999	[ ]
Between 1000- 1499	[ ]	Between 1500-1999	[ ]
Over 2000	[ ]		

2. How often are training sessions carried out in your organisation?

Weekly	[ ]	Quarterly	[ ]	Once a year	[ ]
Monthly	[ ]	After six months	[ ]	On needs basis	[ ]

3. Financial performance. Return on Assets (ROA) for the year ended December 2015.

(To be gathered from secondary data of financial reports of the companies listed on NSE)

1. Negative ROA in %	
2. 0 - 5%	
3. 5.001 – 10%	
4. 10.001 -15%	
5. Above 15%	

SECTION TWO: KNOWLEDGE MANAGEMENT

Indicate the extent to which the following statements describe knowledge management in your organisation.
Use the scale;
1= not at all
2=to a small extent
3=to a moderate extent
4= to a large extent
5= to a very large extent
(Tick)

	Knowledge Acquisition	**1**	**2**	**3**	**4**	**5**
1	Our organisation has procedures for generating new knowledge from existing knowledge					
2	Our organisation has procedures for acquiring knowledge about new products within our industry					
3	Our organisation has procedures for acquiring knowledge about new services within our industry					

4	Our employees obtain new knowledge through seminars and conferences.					
5	Our employees obtain new knowledge from educational courses which lead to certificates					
6	Our employees obtain new knowledge from subscription journals					
7	Our employees obtain new knowledge from expert networks					
	Knowledge Sharing	**1**	**2**	**3**	**4**	
8	Our employees exchange knowledge with their co-workers					
9	Our employees share their knowledge orally at meetings or informal gatherings (e.g. during lunch, in the hallway)					
10	Our employees share their knowledge through formal procedures (e.g. project reports, organisational procedures and instructions, reports and company publications).					
	Knowledge Application	**1**	**2**	**3**	**4**	**5**
11	Our organisation encourages employees to apply newly acquired knowledge					
12	The organisation uses new knowledge to solve problems					
13	Employees can access and apply knowledge from the organisations website.					
14	The organisation takes advantage of new knowledge					
15	The organisation has procedures for using new knowledge in development of new products					
16	The organisation has procedures for using knowledge in development of new services					

SECTION THREE: ORGANISATIONAL CHARACTERISTICS

To what extent do the following statements describe the Organisational Characteristics in your organisation?

Use the scale:

1=not at all

2=to a small extent

3= to a moderate extent

4= to a large extent

5=to a very large extent **(Tick)**

	Organisational Structure	**1**	**2**	**3**	**4**	**5**
1	In our organisation power is centralised at the top					
2	Workers in our organisation are not free to choose between alternative ways of performing their tasks					
3	Communication and control proceeds through hierarchical routes					
4	Managers are expected to mentor and coach subordinates					
5	All employees are involved in the decision making process					
	Organisational Culture	**1**	**2**	**3**	**4**	**5**
6	In our organisation jobs are conducted according to defined rules and procedures					
7	Our organisation continuously adopts new and improved ways to work					
8	In our organisation it is easy to coordinate projects across functional units					
9	In our organisation managers are expected to delegate authority to their subordinates.					
10	Our organisation continually trains employees to enhance innovation and creativity					
11	In our organisation team work is valued.					
12	Information is widely shared in this organisation					

13	The views of our customers are given serious consideration in our organisation.					
14	In our organisation competitiveness in relation to other organisations is constantly measured					
	Human Capital	**1**	**2**	**3**	**4**	**5**
15	Employees in our organisation are experts in their own field					
16	Employees in our organisation have relevant work experience					
17	Employees in our organisation are highly skilled					
18	Employees in our organisation are highly educated					
19	Employees in our organisation are good at developing new ideas					
	Information Technology (IT) Infrastructure	**1**	**2**	**3**	**4**	**5**
20	Our organisation has availed IT tools needed for effective work					
21	In our organisation, IT tools are used to store data on implemented projects, tasks and activities, suppliers and customers					
22	In our organisation video conferencing is used					
23	In our organisation, IT tools are used for communication					
24	Most employees in our organisation find it easy to use the IT systems					

SECTION FOUR:

To what extent do the following statements describe organisational learning in your organisation?

Use the scale:

1=not at all

2=to a small extent

3= to a moderate extent

4= to a large extent

5=to a very large extent **(Tick)**

	Individual Learning Level	**1**	**2**	**3**	**4**	**5**
1	In our organisation, employees help each other learn.					
2	In our organisation, employees are rewarded for learning.					
3	In our organisation, employees give open and honest feedback to each other.					
4	In our organisation, employees generate many new insights					
5	In our organisation, managers continually look for opportunities to learn.					
6	In our organisation, employees accept negative feedback without becoming defensive					
7	In our organisation employees look for new and better ways to work.					
	Group Learning Level					
8	In our organisation, teams/groups have the freedom to adapt their goals in response to emerging needs					
9	In our organisation, teams/groups revise their thinking, as a result of group discussions or information collected.					

10	Our organisation, takes suggestions from teams and groups of employees seriously					
11	Our organisation creates systems for measuring gaps between current and expected performance					
12	Our organisation makes lessons learned available to all employees					
13	Our organisation measures the impact of training.					
14	Our organisation recognises employees who take initiative.					
15	Our organisation gives employees control of resources which they need to accomplish their work					
16	Our organisation works together with the outside community to meet mutual needs.					
17	Our organisation encourages employees to get answers from across the organisation when solving problems.					
18	In our organisation, leaders mentor and coach other employees					

SECTION FIVE; ORGANISATIONAL PERFORMANCE:

To what extent do the following statements describe performance in your organisation?

Use the scale:

1= not at all

2= to a small extent

3= to a moderate extent

4= to a large extent

5= to a very large extent **(Tick)**

	Customer Service	**1**	**2**	**3**	**4**	**5**
1	Our organisation tries to expand its customer base as much as possible to ensure a large market share					
2	As compared to our competitors our prices are much more competitive					
3	As compared to our competitors our market share is larger					
4	As compared to our competitors the rate of customer retention is higher					
5	As compared to our competitors we get a higher percentage of new customers through positive customer referral					
	Internal Business Process	**1**	**2**	**3**	**4**	**5**
6	Our organisation's investment in research and development is above the industry average					
7	Our organisation regularly introduces a larger number of new products as compared to our competitors					
8	Our organisation regularly introduces a larger number of new services as compared to our competitors					
9	Inward logistics i.e. purchasing and stock control are well managed in our organisation					
10	Outward logistics i.e. and after sale services are well managed in our organisation					

11	Quality control is taken very seriously in our organisation					
12	IT and accounts are managed better in our organisation as compared to our competitors					
	Learning and Growth	**1**	**2**	**3**	**4**	**5**
13	Our organisation continually seeks to improve the existing products/ services					
14	Our organisation is continuously designing new products					
15	Our organisation is continually carrying out technological improvement					
16	Our organisation is committed to ensuring that our IT systems comply with the current needs of the company.					
17	As compared to the rest of the industry, our organisation commits more resources and time for research on new products and procedures					

THANK YOU FOR PARTICIPATING

Appendix III: Firms Listed on Nairobi Securities Exchange

Main Investment Market Sector

AGRICULTURAL

1. Kakuzi Ltd
2. Rea Vipingo Ltd
3. Sasini Tea and Coffee Ltd
4. Limuru Tea
5. Williamson Tea Kenya Ltd
6. Kapchorua Tea co. Ltd
7. Eaagads Ltd

AUTOMOBILES AND ACCESSORIES

8. Car and General Ltd
9. Marshalls (E.A.) Ltd.
10. Sammer Africa Ltd
11. CMC holdings

BANKING

12. Barclays Bank of Kenya Ltd.
13. CFC Stanbic Bank Ltd.
14. Diamond Trust Bank Ltd.
15. Equity Bank Limited
16. Housing Finance Ltd.
17. Kenya Commercial Bank Ltd.
18. National Bank of Kenya Ltd.
19. NIC Bank Ltd
20. Standard Chartered Bank Ltd.
21. The Cooperative Bank Ltd.
22. I & M Holdings Ltd

COMMERCIAL AND SERVICES

23. Express Kenya Ltd
24. Kenya Airways Ltd
25. Nation Media Group Ltd.
26. Scan Group Ltd.
27. Standard Group Ltd.
28. TPS East African (Serena) Ltd
29. Uchumi Supermarket Ltd.
30. Hutchings Biemer (suspended) Ltd
31. Longhorn Ltd.

CONSTRUCTION AND ALLIED

32. Athi-river mining
33. Bamburi Cement
34. Crown Berger, ltd
35. East African Cables Ltd.
36. East African Portland Ltd.

ENERGY AND PETROLEUM

37. Kenya Power and Lighting Co. Ltd.
38. Kengen Co. ltd
39. KenolKobil ltd.
40. Total Kenya Ltd
41. Umeme Ltd

INSURANCE

42. Jubilee Insurance Ltd.
43. Kenya Re-Insurance Ltd
44. Pan Africa Insurance Holding Ltd.
45. Liberty Kenya Holdings Ltd
46. CIC Insurance group Ltd
47. British American Investment Company

INVESTMENT

48. Olympia Capital Holdings
49. Centum Investment Co Ltd
50. Trans- Century Ltd

MANUFACTURING AND ALLIED

51. British American Tobacco Kenya Ltd
52. Characid Investment ltd.
53. East African Breweries Limited
54. Eveready east Africa Ltd
55. BOC Kenya Ltd
56. Mumias Sugar Co. Ltd
57. Unga Group Ltd
58. Baumann CO Ltd
59. Kenya Orchards Ltd

TELECOMMUNICATION AND TECHNOLOGY

60. Safaricom Ltd

GROWTH ENTERPRISE MARKET SEGMENT (GEMS)

61. Home Afrika Ltd Ord

Source: Capital Markets Authority (CMA) (Kenya) Annual report (2012)

APPENDIX IVa: Outer Loadings of Original Model

	KM	OC	OL	OP
KAcq1	0.539			
KAcq2	0.698			
KAcq3	0.757			
KAcq4	0.271			
KAcq5	0.297			
KAcq6	0.332			
KAcq7	0.564			
KS8	0.739			
KS9	0.704			
KS10	0.691			
KA11	0.831			
KA12	0.778			
KA13	0.741			
KA14	0.793			
KA15	0.705			
KA16	-0.718			
STR1		-0.018		
STR2		-0.237		
STR3		-0.183		
STR4		0.685		
STR5		0.392		
CU6		0.785		
CU7		0.697		
CU8		-0.764		
CU9		0.379		
CU10		0.501		
CU11		0.660		
CU12		0.700		
CU13		0.720		
CU14		0.690		
HC15		0.811		
HC16		0.712		
HC17		0.736		
HC18		0.561		
HC19		0.588		
IT20		0.786		
IT21		0.731		
IT22		0.514		
IT23		0.646		

IT24		0.577		
IL1			0.842	
IL2			0.558	
IL3			0.759	
IL4			0.815	
IL5			0.796	
IL6			0.675	
IL7			0.786	
GL8			0.811	
GL9			0.789	
GL10			0.888	
GL11			0.741	
GL12			0.836	
GL13			0.804	
GL14			0.785	
GL15			0.822	
GL16			0.826	
GL17			0.808	
GL18			0.828	
CS1				0.816
CS2				0.696
CS3				0.729
CS4				0.774
CS5				0.812
IBP6				0.720
IBP7				0.707
IBP8				0.778
IBP9				0.734
IBP10				0.715
IBP11				0.838
IBP12				0.809
LG13				0.809
LG14				0.806
LG15				0.820
LG16				0.834
LG17				0.804

APPENDIX IVb: Outer Loadings of Respecified Model

Outer Loadings of the respecified model				
	KM	**OC**	**OL**	**OP**
KA11	**0.846**			
KA12	**0.806**			
KA13	**0.746**			
KA14	**0.792**			
KAcq2	**0.717**			
KAcq3	**0.773**			
KS10	**0.726**			
KS8	**0.787**			
KS9	**0.726**			
CU11		**0.708**		
CU12		**0.709**		
CU13		**0.770**		
CU14		**0.715**		
CU6		**0.775**		
HC15		**0.791**		
HC16		**0.750**		
HC17		**0.760**		
IT20		**0.803**		
IT21		**0.770**		
GL10			**0.897**	
GL11			**0.751**	
GL12			**0.840**	
GL13			**0.808**	
GL14			**0.784**	
GL15			**0.834**	
GL16			**0.833**	
GL17			**0.819**	
GL18			**0.817**	
GL8			**0.808**	
GL9			**0.798**	
IL1			**0.839**	
IL3			**0.748**	
IL4			**0.815**	
IL5			**0.787**	
IL7			**0.780**	
CS1				**0.826**
CS3				**0.737**

CS4				**0.793**
CS5				**0.802**
IBP10				**0.703**
IBP11				**0.845**
IBP12				**0.825**
IBP6				**0.719**
IBP8				**0.781**
IBP9				**0.757**
LG13				**0.803**
LG14				**0.789**
LG15				**0.827**
LG16				**0.843**
LG17				**0.791**