College of Business and Economics

Master of Business Administration Program

Relationshipbetween Intellectual Capital and Innovations: The Mediating Role of Organizational Capital

(The case of Commercial Banks in Ethiopia)

A Thesis Submitted to the Department of Management in Partial Fulfillment of the Requirements for the Degree of Master in Business Administration.

By

AsheberDemissie
(Email: ashudem@yahoo.com)

Research Advisor: GemechuWaktola (PhD)

June 2016

Addis Ababa, Ethiopia

DECLARATION

I hereby declare that this work entitled "**Relationship between Intellectual Capital and Innovations: The Mediating Role of Organizational Capital(The case of Commercial Banks in Ethiopia)"** is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

AsheberDemissie_ _____

Candidate's Name Signature & date

Advisor's Approval

This Thesis has been submitted for examination with my approval as a University advisor.

GemechuWaktola (PhD) _____

Advisor's Name Signature & date

Addis Ababa University

College of Business and Economics

MBA Program

This is to certify that the thesis prepared by AsheberDemissie entitled: "**Relationship between Intellectual Capital and Innovations: The Mediating Role of Organizational Capital(The case of Commercial Banks in Ethiopia)"** and submitted in partial fulfillment of the requirements for the degree of Master of Business Administration in Management complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Approval of Board of Examiners

_____ _____

Internal Examiner Signature & Date

_____ _____

External Examiner Signature & Date

Acknowledgments

First and for most, thanks to God, the almighty, for his showers of blessings throughout my research work to complete the research successfully. I would also like to thank the mother of JESUS, Mary.

I would like to express my deep and sincere gratitude to my advisor Dr. GemechuWaktolafor his constructive criticism, immediate response, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis.

My sincere thanks also goes to Mulugeta who enlightened me the first glance of the research, offered and introduced me the software.

Besides, I would like to thank my fiancé Adeyabeba Mitiku for her motivation and endorsement throughout the program.

I would like to thank my sisters: FantayeDemissie, AlemDemissie and SelamawitDemissie for standing by my side in my entire life.

Last but not least; I also thank my friends ZerihunCherinet,EnsermuTesfaye, TheodrosSileshi and BrukAmsalu for their support and encouragements.

Abstract

The study was conducted with the aim of investigating the direct and indirect effect of intellectual capital on innovations considering organizational capital as a mediator in the Ethiopian commercial banking sector. Primary data was collected using a 5 item likert scaled questionnaire from 235 branch managersfrom282 expected sample size having a response rate of (83%). Data was tested in confirmatory factor analysis and it fulfills construct validity (both convergent and discriminant validity) using Analysis of Moment Structure (AMOS) version 20. A deductive and quantitative approach was followed to test the model. Empirical findings of the study show that, intellectual capital does not have a significant direct effect on product innovation with the exception of organizational capital. Organizational capital mediates the relationship between intellectual capital and innovations. Human, organizational and customer capital have a positive direct effect on process innovation while social capital has a negative direct effect. Human, customer and social capital do not have a significant direct effect on Ethiopian banking sector's product innovation.To becompetitivein the industry, managers should utilize the skills, competencies, and experiences of their employees through well designed learning, organizational culture and supportive organizational structure.

Key words: intellectual capital, product innovation, process innovation

Table of Contents

Contents Page

List of Tables

TablesPage

List of Figures

Figures **Page**

Acronyms

AMOS:	Analysis of moment structures
ANT	Actor network theory
CC	Customer capital
CFA	Confirmatory factor analysis
CFI	Comparative fit index
EFA	Exploratory factor analysis
FA	Factor analysis
GOF	Goodness of fit indices
HC	Human capital
IC	Intellectual capital
KBV	Knowledge based view
MI	Modification index
OC	Organizational Capital
PCA	Principal Component Analysis
PCFI	Parsimony comparative fit index
PCI	Process innovation
PDI	Product innovation
PNFI	Parsimony normed fit index
RBV	Resource based view
RMR	Root Mean Residual
RMSEA	Root Mean Square Error of Approximation
SC	Social capital
SEM	Structural equation modelling
SMC	Squared multiple correlations
SPSS	Statistical Package for Social Sciences
TLI	Tucker-Lewis index
VIF	Variance inflation factor

Chapter One: Introduction

1.1 Background

Innovation is viewed as a major source of competitive advantage and is perceived to be a prerequisite for organizational success and survival. The ability to innovate depends largely on the way in which an organization uses and exploits the resources available to it. (Charles O., 2004).

Innovation is seen by shareholders, staff, and customers as a new tool in creating wealth (Ketchen et al.,2007). Innovation plays an important role in reinforcing a firm's efficiency. In the face of more intense competition and environmental uncertainty, the ability to innovate has become increasingly important as a means not only to encourage growth but for survival.(Dinopoulos and Syropoulos, 2007).Firms should be able to adapt and evolve if they wish to survive as their competitors adopt new products or processes in order to enhance their competitive power.

In a turbulent economic environment with rapid changes in technology, markets, competitive environment, customer preferences and financial crises, firms are facing an "innovate or die" situation (Madrid-Guijarro et al., 2009) and innovation is a key element for survival.

Oddane (2008) defines innovation as a collective, open-ended activity aimed at the creation and implementation of new, appropriate products or processes in order to generate significant economic benefit and other values. Innovation refers to new applications of knowledge, ideas, methods, and skills which can generate unique capabilities and leverage an organization's competitiveness (Kim et al, 2012).Three different types of innovation can be identified (Olcyzk, 2011): product, processand Organizational Innovations. Product innovations are understood as launching a commodity or service, which is new or refined in its features or applications. Process innovations are defined as implementing new or substantially refined production methods, distribution or marketing methods and supporting operation in goods manufacturing and services. Organizational innovations refer to the creation of new organizational methods in the company's rules of operation (knowledge management), in the organization of the workplace or the rapport with the environment.

In the knowledge economy, organizations' success depends on managing intellectual capital (IC); and we must first identify and measure them and ultimately manage them. IC is called a collection of knowledge-based assets that is assigned to an organization and is considered among its features and leads to organizations' considerable competitive improvement through adding value to key stakeholders of organization (Masoud et al, 2014). Hsu and Frang (2009) defined IC "as a company's total capabilities, knowledge, culture, strategy, process, intellectual property, and relational networks which create value or competitive advantages and help a company to achieve its goals". Intellectual capital is not only possession of components of IC but also investing in IC through the effective interactions between these components in order to maximize the firm's output.According to study by Huang (2008), IC is classified as customer capital, process capital, human capital and innovation capital. Typically most firms have three forms of IC embedded in their people, structures, and customers. These are human capital, structural capital, and relational capital (Rosni and Rosli, 2013).

The study adopts the classifications of IC given and used by Ahmed, (2014) who included human, social, customer and organizational capital while the last will be used as a mediator in converting the rest of IC components in to innovations.

In order to conduct investigation of IC in connection with innovations, this study focuses on the banking sectors and more specifically on Ethiopian banking sector for the following reasons. Firstly, in emerging economies, banks are a key factor in economic growth at the macroeconomic level (Rehman et al, 2012). Banks' services are considered to be a central product of all economic activities for individuals, firms and governments which are forced to use them. Secondly, banks represent one of the most important knowledge-intensive industries; this suggests that IC has become a key resource to sustain innovation (Khedr, 2008). Thirdly, the context of innovation differs from industry to industry and from sector to sector. Consequently, a theory, produced in one sector, might not be generalized in another sector (Adams, 2003). Fourthly, banks have been adopting different technological products and systems such as Smart, Tameness and Branch Power and the like (Mulugeta, 2015).

1.2 Problem Statement

Innovation is considered to be very important in a turbulent environment to achieve a competitive advantage both in the manufacturing and service sectors. However, most innovation researches have focused mainly on the manufacturing sector (Droege et al, 2009; Perks et al, 2012). In the same line, researches investigating innovation in the service sector are underrepresented while none of them investigated the effect of intellectual capital on innovations (Gopalakrishnan and Damanpour, 2000).

Organizational capital (OC) is a critical component in leveraging IC to achieve the organization aims. In other words, if a firm includes poor processes and systems, the overall IC is unable to accomplish its aims (Bontis,1998). The previous studies considered that OC was integrated with all kinds of intangible assets.

OC which includes organizational infrastructure, organizational culture and knowledge management, is considered to be a key mediating variable in the relationship between intangible assets such as human, social and customer capital and innovative capability (Huang, Lai and Lin, 2011). Hence, it is a central requirement for innovative capabilities. OC represents the organizational infrastructure through which HC can create added value (Bontis, 2001;Chen, Lin, and Chang, 2006). Strong organizational culture plays an important role in developing employees' competencies which contribute to satisfying the needs of their company and customers (Kim et al., 2012). Foss, Laursen and Pedersen, (2011) explained that, in the context of innovation, organizational practices, such as organizational structures could sustain firms to develop their customers' knowledge. In other words, organizational practices have the capabilities to absorb from customers the information and knowledge which support the decisions related to an innovation project.

Ahmed (2014) argued that previous studies have not well examined both the direct and indirect relationship between the components of IC namely human, social and customer capital and the different types of innovations, namely product and process at the same time in service sectors. Furthermore, the interaction among the actors of IC in the service sector has not been well studied though some work has been done to test the interaction among innovations; organizational, process and product innovation in the manufacturing sector (Ahmed, 2014**)**.

Over and above the arguments made in the previous paragraphs none of the previous studies used OC as a mediating variable while it has been suggested by authorities in the field of study to be studied in developing country context. In view of this what remains to be explored is to investigate the direct and indirect effects of IC on innovations using OC as a mediator in the service sector.

Most importantly, as far as the researcher's knowledge is concerned, the absence of enough similar empirical studies conducted in the Ethiopian context also motivated the researcher to put his own contribution. Ethiopian banking sector is not yet well strong as developed countries. Meanwhile,the country is on the verge of being a member of world trade organization (WTO).As a result, potential foreign banks could come to invest which will have huge effect on the destiny of the local banks.

Therefore, the study investigated the direct and indirect relationship between components of intellectual capital (HC, SC, and CC) and innovations (product and process innovations) by taking Organizational Capital (OC) as mediating variable.

1.3 Objective of the Study

1.3.1 General Objective

The main objective of the study is to investigate the direct and indirect (via organizational capital) relationship between components of intellectual capital (human, social and customer capital) and innovations (product innovation and process innovation) in the Ethiopian Commercial banking sector.

1.3.2 Specific Objectives

Based on the above general objective, the following are specific objectives:

- To examine the effect of intellectual capital on innovations.
- To identify which component of IC has the dominant effect on innovation?
- To investigate the role of OC as a mediating variable between IC and innovations.

1.4 Research Questions

In order to address the research objectives, the following general question is proposed:

What are the roles of the components of IC in supporting the different types of innovation?

The research divides this question into the following sets of sub-questions:

- What are the effects of intellectual capital on innovations?
- What are the indirect effects of social, human and customer capital on innovations via organizational capital?

1.5 Research Hypothesis

The research develops basic two hypotheses based on previous studies in order to answer the research questions. These hypotheses are presented as follows:

Firstly, the direct effect of intellectual capital on innovations.

This hypothesis is divided into the following sub-hypothesizes:

H1: organizational capital has a positive effect on innovation

H1a: organizational capital has a positive effect on product innovation

H1b: organizational capital has a positive effect on process innovation

H2: Human capital has a positive effect on innovation.

H2a: Human capital has a positive effect on product innovation.

H2b: Human capital has a positive effect on process innovation.

H3: Social capital has a positive effect on innovation.

H3a: Social capital has a positive effect on product innovation.

H3b: Social capital has a positive effect on process innovation.

H4: Customer capital has a positive effect on innovation.

H4a: Customer capital has a positive effect on product innovation.

H4b: Customer capital has a positive effect on process innovation.

Secondly, IC has an indirect effect on innovations via organizational capital (OC)

This hypothesis is classified into the following sub-hypothesizes:

H5: organizational capital mediates the relationship between human capital and innovation.

H5a: OC mediates the relationship between human capital and product innovation.

H5b: OC mediates the relationship between human capital and process innovation

H6: OC mediates the relationship between social capital and innovation.

H6a: OC mediates the relationship between social capital and product innovation.

H6b: OC mediates the relationship between social capital and process innovation.

H7: OC mediates the relationship between customer capital and innovation.

H7a: OC mediates the relationship between customer capital and product innovation.

H7b: OC mediates the relationship between customer capital and process innovation.

1.6 Significance of the Study

The study is expected to provide empirical evidence on the relationship between IC and innovations of service sector and commercial banking sector of Ethiopia in particular. The results of the study, if properly used, can provide information to managementand employees, customers, owners (shareholders of banks) and the government as well.

1.7 Limitation of the Study

The study used cross sectional data obtained using closed ended likert scale questionnaire collected from managers of banks and yet it did not gather longitudinal or panel data to observe changes in IC throughout the innovation process.

1.8 Delimitation of the Study

The study tested the model only on Ethiopian Commercial Banks located in Addis Ababa, capital city of Ethiopia.

1.9 Organization of the Study

In addressing the research objectives, this thesis is structured into the following chapters: chapter two discuss about theoretical and empirical literature review, chapter three is about research design and methodology, chapter four is about results and discussions and chapter five presents conclusions and recommendations of the results.

Chapter Two: Review of Literature

2.1 Introduction

The chapter contains theoretical and empirical literature review and conceptual framework or model. Theoretical literature review discusses about the concepts, definitions and components of both explanatory and explained variables under the study. Empirical literature review presents works which have been forwarded by previous researchers. Finally, the chapter comes up with conceptual framework or model depicting the relationship between variables under the study.

2.2 Concepts and Definitions of Innovations

Innovation is a fundamental requirement for survival and growth in these environments (Bohlmann et al, 2012). Organizations consider innovation to be a critical variable between life and death. Moreover, Cooper, (2011) views that the goals of ambitious organizations can be achieved through innovation. In the 21st century, this is one of the main resources needed to achieve sustainability and economic growth (Atalay and Anafarta, 2011).

Although innovation has played a key role in supporting the growth of both the manufacturing and services sectors, Droege et al., (2009) state that innovation studies focus mainly on the manufacturing context whilst a few studies investigated innovation in the service sector and especially in the banking industries.

Rogers (1995) also shows that innovation creates a new idea, practice, or object according to the view of an individual or other unit of adoption. Thus, innovation can occur in domains of product, process and organization. In addition, Rogers discusses another concept known as diffusion of innovation which, over time, focuses on the spread, through particular channels, of innovation among the members of a social system. Tushman and Nadler (1986) also defined innovation as the creation of any product, service, or process which is new to a business unit.

In contrast, Amabile (1983) suggests that innovation is different from creativity which is the only thing that could be defined as the production of new ideas. Santos-Rodrigues *et al* (2011) contend that it is important to highlight the differences between concepts, i.e. invention is an original creation of an idea, and creativity is the creation of new ideas, while innovation is not

just about creativity it has to translate into value. Innovation can be considered as the economic exploitation of creativity. Innovation generates and implements new ideas, processes, and products. Therefore, creativity is a component of innovation. This group considers that innovation included the creation and adoption of new ideas. Ahmed, (2014) shows that in the social and economic scopes, innovation is a function of the successful exploration and exploitation of novelty. Furthermore, it means the introduction of a new solution to tackle problems. This solution should satisfy the need of firms, employees and other stakeholders. For example, innovation can provide easier communications (internet, mobile phones), new marketing methods (electronic banking) and better working environments (computers). Damanpour and Evan (1984) defined that innovation is the adoption of a new idea or behavior new to the adopting organization. Innovation is the specific tool of entrepreneurs; the means by which they exploit change as an opportunity for a different business or service. It is capable of being presented as a discipline; capable of being learned; capable of being practiced. Oddane (2008) defined innovation is a collective, open-ended activity aimed at the creation and implementation of new, appropriate products or processes in order to generate significant economic benefit and other values. Kim et al (2012) defined as innovation refers to new applications of knowledge, ideas, methods, and skills which can generate unique capabilities and leverage an organization's competitiveness.

In view of the above definitions, this study considers that innovation is a planned integrated activity to adopt or develop a new behavior, product or process to achieve some benefits for employees, firm, group or other stakeholders. It also considers innovation is a combination of generation of new ideas (creativity) and implementation of these ideas.

The degree of innovation might be totally new or incremental (relative).The requirements of absolute novelty would create large difficulties in collecting the research data from firms which used objective novelty (Ahmed, 2014). Additionally, it is quite rare to find something "entirely new" (Oddane, 2008). Therefore, the research considers that relative novelty of innovation is more appropriate for this study.

The definition is not limited to technological change and includes new ideas, products or processes which have administrative and technological innovation (Ahmed, 2014). Innovation

could occur not only in technological processes, but also in management methods and organizational practices (Damanpour and Evan, 1984).

2.3 Types of innovations

It is necessary to recognize the different types of innovation with their different features. Each type needs specific responses from a firm in order to achieve successful innovation (Ahmed, 2014). When it comes to innovation, the term is often used, but hard to define. Two different types of innovation can be identified (Olcyzk, 2011): Product andprocess innovations. Some of these classificationsare presented as follows:

2.3.1 Radical / Incremental Innovation

One of the most common ways of defining and classifying innovation involves its degree of novelty, from incremental to radical ones (Delgado, 2011), describes radical innovations as revolutionary or discontinuous changes, while incremental innovations are conventional or simple extensions in a line of historical improvements. Radical innovation creates a new need which has not previously been recognized by customers. Firms have to make extensive investments in the processes of production, communication and distribution and, therefore, the risks of radical innovation are increased when the development cycle is too long and so reduces the rate of success (Kim et al 2012).

In contrast, incremental innovations are minor developments or the refinements of the existing products, services and processes (Un, 2010). Incremental innovations are concerned with creating a significant value for the firm or industry by improving the infrastructure or the current processes and products (Ritala and Hurmelinna-Laukkanen (2013). Subramaniam and Youndt, (2005) observed that incremental innovations involve “improving and exploiting an existing technological trajectory,” whereas radical innovations “disrupt an existing technological trajectory.”

2.3.2 Technological / Administrative Innovation

Administrative innovation is related to the application of new ideas in order to improve administrative processes, organizational structures and human resources. Although it does not provide new services or products, it can indirectly affect their introduction (Damanpour, 1987). Organization innovations refer to the creation of new organizational methods in the company's rules of operation (knowledge management), in the organization of the workplace or the rapport with the environment (Olcyzk, 2011).

Administrative innovation often responds to the firm' needs for internal structures. They pertain to structures, rules, roles and procedures. These tools play a key role in supporting communication between employees and improving work performance. Consequently, administrative innovation is concerned directly with organizational management whilst it is related indirectly to the basic activities of work. Administrative innovation is top-down adoption which is initiated and supported by upper level managers. This means that administrative ideas should be innovating firstly by the firm's top level managers and then be delegated to employees (Jaskyte, 2011).

In the modern world, technological innovation, based on creating knowledge and applying knowledge (Betz, 2011) is an important factor for progress. Moreover, technological innovation increases production and promotes current products more efficiently.

2.3.3 Product / Process Innovation

Typically, the organization uses these two types of innovation to create competitive advantage. Product innovation refers to "Producing new products or a respond to an external consumer or a demand of the market", and process innovations is, in fact, "The new elements that are used in the productions or service activities of the organization" (Betz, 2011).

In an increasingly intense competitive environment, product innovation plays a key role in achieving the firm's aims. Process innovation is also an essential factor in supporting a firm in this environment and, because it is difficult to copy, it is considered to be a vital source for a firm to gain a competitive advantage.

Product innovations are understood as launching a commodity or service, which is new or refined in its features or applications (Olcyzk, 2011). Product innovation is related to developing or producing new goods or services to meet the customers' needs (Un et al, 2010). In terms of product innovations in banks, there are many products such as mortgages, ATMs, m-banking, e-money, e-wallets, debit cards and personal bankers (Ahmed, 2014).

Process innovation are defined as implementing new or substantially refined production methods, distribution or marketing methods and supporting operation in goods manufacturing and services (Olcyzk, 2011). Process innovation is the discovery of a new process or method for the production of goods and services. The process innovations of banks include automated voice response systems, computers, faxes, the internet, the streamlining of the cheque-handling process and the creation of new methods of service delivery (Ahmed, 2014).

After analyzing different kinds of innovations, this study adopts two kinds of innovations namely product and process innovations for the following reasons: First, Subramaniam and Youndt, (2005) examined the relationship between intellectual capital and radical and incremental innovation. Second, As far as the researcher's knowledge is concerned, only (Ahmed, 2014) has examined the relationship between the components of IC and process, product and administrative innovation.

Consequently, the study adopted the classification of innovation as product and process as this classification is suitable for service sectors more specifically in banking sector as radical and incremental innovation classification is more appropriate or suitable for manufacturing industry.

2.4 Concepts and Definitions of Intellectual Capital

In the knowledge economy, organizations' success depends on managing intellectual capital (IC) and we must first identify and measure them and ultimately manage them. IC is called a collection of knowledge-based assets that is assigned to an organization and is considered among its features and leads to organizations' considerable competitive improvement through adding value to key stakeholders of organization (Masoud et al, 2014).

According to Ramanauskaitė (2012), IC constitutes resources created, purchased or maintained by an enterprise, which possess no material form; these resources, together with material and financial assets of the enterprise, help to create added value.

According to the above definition, IC has no material form and it may be acquired, created or merely maintained within an enterprise without considering ownership rights. IC components cannot act as separate entities; only as the whole and only together with other resources of the enterprise is the creation of value in the future made possible.`

Bontis (2002) defines IC as a set of intangible assets (resources, capabilities, competition) that are obtained from organizational performance and value creation. Edvinson and Malone (1997) define IC as "applied information and knowledge to work for value creation". IC is an asset that measures an organization's ability to create wealth. The asset does not have objective and physical nature and is an intangible asset that is obtained through using assets related to human resources, organizational performance and relations out of organization. ICs are intellectual materials that can be captured as assets, such as knowledge, information, intellectual property, and employees' experiences, commitments or capabilities (Barney, 2002).

Stewart (1997) defined IC is a total stock of the collective knowledge and capabilities each employee contributes to the company's competitive advantage. Masoulas (1998) believed that IC is the combination of intangible assets that adds value to its effort to achieve its goals. An organization which understands intangible assets such as skills, experience, attitude and information of the employees can obtain added value from work. Hsu and Frang (2009) defined "IC is defined as a company's total capabilities, knowledge, culture, strategy, process, intellectual property, and relational networks which create value or competitive advantages and help a company to achieve its goals".

By reviewing the above definitions, this research adopted IC is not only possession of components of IC but also investing in IC through the effective interactions between these components in order to maximize the firm's output.

2.5 The Components of Intellectual Capital

IC is divided into (1) human resource capital: employees of an organization; (2) structural capital: formal and informal systems that are basis of efficiency and effectiveness of organizational operations; and (3) relationship capital: relationships between organization and external agency, such as supplier and customer (Xiaobo and Sivalogathasan, 2013).

According to study by Huang (2008), IC is classified as customer capital, process capital, human capital and innovation capital. Typically most firms have three forms of IC embedded in their people, structures, and customers. These are human capital, structural capital, and relational capital (Rosni and Rosli, 2013)

Some researchers classified IC into three types: human capital, organizational capital and relational capital or customer capital (Ahmed, 2014).

Based on the above studies, this study adopts four components of IC include; human capital (HC), relational capital (consists of social capital (SC) and customer capital (CC)) and organizational capital (OC).

2.5.1 Human Capital

HC is the knowledge, skills, experience, intuition, and attitudes of the workforce and can be enhanced by increasing the capacity of each worker (Stewart, 1997). HC refers to the human aspect of the organization, i.e., the combination of skills, qualifications and expertise that provides individual character (Bontis, 2002).

Firms should deal with employees as an asset rather than as a cost since HC is a valuable factor for performance considerations. In the service economies, HC's importance and efficiency is considered to be one of the cornerstones of a successful firm. Crook et al., (2011) mention that, for both firms and employees, investment in HC could produce significant outputs performance.

Human capital is one of the main type or even the most important type of intellectual capital in an organization because of being the resource of creativity. This type of assets places an implicit knowledge in the individuals of an organization which is a crucial effective element on each

company yield. HC is a collective combination of employees' general and professional knowledge; leadership, problem solution, and risk taking abilities (Mohammad and Hassan, 2013)

Based on the above discussions, this research adopts that HC embraces employees' competencies including knowledge, skills, talents, experiences, qualifications and education.

2.5.2 Relational Capital

Relational capital is a knowledge embedded in internal relationships known as SC and external relationships such as those between a firm and its customers called CC (Ahmed, 2014).

2.5.3 Social Capital

Putnam (1995) maintains that "SC refers to the features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit."SC is one of the topics related to informal communication (Yamaguchi, 2013). Academic research on management has become increasingly interested in SC since it is considered to be a valuable resource for successful innovation and performance (Arribas et al 2013). SC is related to the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit (Ahmed, 2014). Moreover, Subramaniam and Youndt (2005) explain that SC represents the informal interactions amongst employees in developing a smooth and preferred work atmosphere through team members exchanging information. Therefore, SC is a result of the interaction and collaboration amongst employees within an organization through sharing knowledge and experiences.

SC encompasses the context, stock of relationships, interpersonal trust and norms that allow certain behaviors and relationships between individuals, and that ensure conditions for the development of organizations and knowledge sharing (Xiaobo and Sivalogathasan, 2013).

2.5.4 Customer Capital

Customers are the most important element of a firm, especially in banking activities. This is because banks work in a seriously competitive environment not only in terms of other banks but

also because of other financial institutions. Therefore, building good customer relationships supports them in adapting to this environment (Rosni and Rosil, 2013)

CC is defined as knowledge resources derived from the relationships with customers. This intangible element embraces the knowledge which customers possess. CC is considered a central source of an organization's current and future profits. Also, CC is the value of relationships between a firm and its customers). However, CC can be viewed as a key element of relational capital (Yamaguchi, 2013).

2.5.5 Organizational Capital

OC relates to an organization's knowledge and codified experience; these are part of its organizational culture, its knowledge management system, efficient processes and top management support (Yang and Lin, 2009). Culture is defined as a set of norms and expectations, values, beliefs and attitudes which are common to a group (Jacobs et al., 2013). Organizational structure is defined as how authorities and work roles are distributed in order to organize and control decision-making activities (Huang et al 2011). Top management support is defined as the level of support top management gives to innovation through providing adequate capital, human resources and a suitable work environment in which to encourage creativity and innovation (Carbonell and Rodríguez-Escudero, 2009).

Knowledge Management refers to the process of creating, sharing and applying knowledge resources (Lavie and Drori, 2012). Knowledge acquisition is a mechanism which facilitates obtaining knowledge or it is a process related to absorbing critical knowledge from its resources. A firm obtains knowledge from the outside marketplace and its employees. These resources provide many opportunities for organizations to recycle their current knowledge in order to create more valuable knowledge (Antonio et al, 2012).

2.6 Theoretical Bases

2.6.1 Resource-based View

The Resource-based view (RBV) confirms that an organization's performance relies on a set of internal resources and capabilities. It focuses on the internal resources and capabilities which can

reinforce competitive advantage. Moreover, the RBV considers that a firm is made up of a heterogeneous set of tangible and intangible resources. This heterogeneity gives more flexibility to firms to compete in the marketplace (Ahmed, 2014).

Acur et al. (2010), aims to illustrate the role of resources in supporting organizational performance in a dynamic, competitive environment. These resources are employed to support firms in producing better products and services in order to satisfy customers' needs. These resources have four attributes. They are rare, valuable, have few substitutes and are not easily imitable. Firstly, in order to have a competitive advantage, resources should be rare. Secondly, if resources facilitate the firm to exploit opportunities or deal with threats and risks, these resources are valuable. This allows the firm to focus its effort towards the determined aim. Thirdly, the different resources face many difficulties in replacing the valuable resource. Fourthly, competitors should find it difficult to imitate this resource (Ahmed, 2014).

The RBV is also an important topic in the management of innovative technology and is considered to be a key approach in understanding innovation. Resource development is a key factor in innovative products and services. The RBV states that intangible resources, such as IC, are the key elements of a firm's success. These resources have the ability to reinforce competitive advantage and innovation is considered to be a source of competitive advantage (Abu Bakar and Ahmad, 2010).

Hence, the RBV considers that an organization's resources support innovation. Furthermore human resource management researchers employ RBV by strategy because a firm is a pool of HC which is a source of innovation and competitive advantage. Additionally, the RBV confirms that intangible resources such as OC and SC are the key drivers of product innovation performance (Abu Bakar and Ahmad, 2010).

On the other hand, Martínez et al (2012) state that this theory emphasizes the role of marketing resources, such as CC, in supporting competitive advantage. It encourages firms to build an effective relationship with customers in order to complete a successful new product. Consequently, the integration between internal knowledge, such as HC, SC and OC and external repositories, such CC, maximize the valuable knowledge which is a cornerstone of innovation.

RBV emphasizes the importance of an organization's resources, such as IC, in supporting innovation and competitive advantage. It gives all these resources the same importance in terms of supporting innovation. It also does not investigate the interactions among these resources or the actors that provide a suitable working environment for innovation. Moreover, the RBV only focuses on internal resources whilst the research model has a variable which is related to knowledge about customers named CC (external knowledge). Accordingly, the RBV doesn't explain all research hypotheses.

2.6.2 Knowledge -based View

Knowledge-based View (KBV) focuses only on intangible assets whilst the RBV is concerned with both physical and non-physical resources (Martínez et al 2012). In the new economy, knowledge has a strategic position in creating a firm's value; this encourages the researchers to develop the KBV. It assumes that knowledge is the main source of a firm's outcomes. Knowledge is a unique resource. It is the most difficult resource to duplicate and it needs to be integrated with many different capabilities (Abu Bakar and Ahmad, 2010).

Stewart (1997) asserts that firms need to create new knowledge or IC in order to survive. The KBV views organizations as repositories of knowledge embedded in organizational processes, competences and relationships. Moreover, knowledge is a key source for competitive advantage which is translated into innovation. Successful innovation relies on the amount of knowledge possessed by the firm. The KBV gives a new view for the implications of product and process innovations (Martínez et al, 2012).

Although the KBV can contribute to explaining the above relationships, it focuses only on the direct effects and it gives all actors the same importance in supporting innovation.

2.6.3 Actor-network Theory (ANT)

ANT is a research methodology which provides further exploration in developing project management knowledge in order to support the project's aims (Pollack et al, 2013). ANT has been applied to management and organization studies especially in terms of innovation (Young et al, 2010).

ANT states that the world is made up of the interactions between human and non-human actors which produce a network. Consequently, a network is described as a black box since it includes complex relationships. In studying the networks of connections made by mediators taking action, (Pollack et al, 2013) report that ANT was also employed to investigate how different actors worked together to achieve the network's final goal.

ANT considers that a network should possess a determined goal based on the alignment of interests. It stresses shared action for fulfilling the project's aims. Therefore, although a network includes various actors, they have aligned interests (Martínez et al, 2012).ANT confirms that the process of building or evaluating an actor-network should cover a series of four moments of translation, namely, problematisation, interessement, enrollment and mobilization (Young et al., 2010).

Problematisation describes the nature of the problem whereby the focal actor (the main actor that has resources and authorities to convince other actors to accept the network interests) defines a problem which other actors consider as their own problem (Ahmed, 2014).Interessement relates to the focal actor persuading actors initially to adopt the suggested path. Consequently, it is considered to be a negotiated stage. While the problematisation phase defined the actors' allowable interests and identities, interessement strengthens the relationships between actors through stabilizing these actors' identities and interests (Martínez et al 2012).Enrolment means that the actors accept the the network's roles and interests which are decided on the above stages. Mobilization is the process in that certain actors are considered to be spokespeople or representatives to attract other relevant actors to support a network's aim. Therefore, maintaining the network is completed through persuading the actors that have interests which are consistent with the focal actor's interests. Also, they encourage others to participate in the actor network (Young et al., 2010).

By reviewing the above researches, this study considers HC, SC, CC, and OC are actors or factors which can support innovation and the focal actor is OC.

2.7 Empirical Review

This section aims to analyze the previous studies which have been conducted on intellectual capital and innovations. More specifically, this part of the study tries to reviewthe direct and indirect effect (via OC) of components of intellectual capital (HC, SC, and CC) on innovations and finally develops hypothesis.

2.7.1 The Direct Effect of IC Components on Innovations

2.7.1.1 The Direct Effect of OC on Innovations

OC has a positive effect on the performance of new product development (Menona, et al., 2002). Wu et al., (2008) state that there is a positive relationship between OC and innovation and that OC supports the relationship between social capital, entrepreneurial orientation and innovation OC. Incremental innovation is associated positively with OC (Subramaniam and Youndt, 2005).

Consequently the study suggested the following hypothesis.

H1: OC has a direct positive effect on the two types of innovations

2.7.1.2 The Direct Effect of HC on Innovations

Rosni and Rosli (2013) conducted a study on relationship of IC dimensions and performance of banks in Malaysia. The results of their study revealed that significant relationships exist between human and structural capitals and bank performance.

Schneider et al (2010) revealed that the value and unique competencies of employees were associated positively with product innovation in the manufacturing sector. Meanwhile, employees, who lacked skills, could act as a barrier to innovation. In a research on the effect of intellectual capital on organizational innovations among 32 employees for Iraq car manufacturing and textile industries Ahmad (2012), figured out that HC has positive and meaningful effect on innovations.

In contrary to the above results, Subramaniam and Youndt (2005) examined the effect of a firm's HC and SC on their innovativeness using a longitudinal data from 1998-2001 from 93 public

firms in USA, and the results of their study shows that contrary to most studies on the relation between human capital and innovation, a significant negative relation is found between HC and radical innovations.

As a result, the researcher suggests the following hypothesis.

H2: HC has a direct positive effect on the two types of innovations.

2.7.1.3 The Direct Effect of SC on Innovations

Subramaniam and Youndt (2005) found that SC had a significant effect on both incremental and radical innovative capabilities. Molina, and Martinez, (2010) found that, in Spanish manufacturing firms; there was a positive relationship between SC and process and product innovation. Syed et al (2014), on their study impact of SC and firms' innovative capability on sustainable growth of women owned enterprises in Malaysia revealed that significant direct relationship of SC and innovative capability with firms' sustainable growth was found. Trust in the relationships reflected positively on the performance of innovation and the launch stage for product innovation Social networks have an ability to reinforce potential breakthrough innovations (Baba and Walsh 2010).

A study by Xiaobo and Sivalogathasan (2013), on innovation capability for better performance on IC and Organization Performance of the Apparel Industry in Sri Lanka, found that SC and organizational capital have positive relationship with innovation.

Consequently, the researcher developed the following hypothesis.

H3: SC has a positive direct effect on the two types of innovations.

2.7.1.4 The Direct Effect of CC on Innovations

The study conducted by John (2013), entitled influence of intellectual capital on the growth of small and medium enterprises in Kenya found out that CC as a factor of IC influences the growth of Small and Medium Enterprises (SMEs) in Kenya. According to the findings, customer capital as a factor of IC influences significantly positively the growth of SMEs in Kenya. This indicates that customer capital which entails a solid stock of connections, interactions, relationships,

linkages, closeness, goodwill, and loyalty between a firm and its customers, downstream clients, strategic partners or other external stakeholders is an important element of intellectual capital that has a positive and significant influence on the growth of SMEs in Kenya. Especially in the service sector, organizations believe that the customer is a cornerstone of innovation (Santos et al, 2011). Similarly, Chen et al, (2006) found that, in Taiwanese SMEs, CC affected positively the development of new products. Acquiring information about customers' needs is a necessity when redesigning a service process. Process innovation should make use of dynamic cooperation between a firm and its customers. The study conducted by Ahmed (2014) revealed that there is a positive effect of customer capital on product, process and organizational innovation.

The results of the above studies indicate that CC is an important IC component which affects innovations positively. Accordingly, the researcher suggests the following hypothesis.

H4: CC has a positive direct effect on the two types of innovations.

2.7.2 The Indirect effect of IC on Innovations (Mediated by OC)

There are only very few studies which have been conducted on the indirect effect of IC on innovations and many IC studies focused mainly on a direct innovation relationship. As shown above, they discovered that HC, SC, CC and OC were associated positively with innovation (radical; incremental innovation; new product development performance; and innovative capabilities) (Ahmed 2014). However, others such as Foss et al (2011) found that customer interaction did not have a significant effect on innovative performance. Subramaniam and Youndt (2005) found that HC had a negative effect on radical innovation capabilities and did not have a significant relationship with incremental innovation capabilities. Wu et al (2008) considered that SC was not related significantly to innovation.

There has been very little empirical study testing of intermediating variables through which, ultimately, SC, CC, and HC affect the different types of innovations. The research results encourage the investigation of potential mediating variables. OC is a critical component in leveraging IC to achieve the organization aims. In other words, if a firm includes poorprocesses and systems, the overall IC is unable to accomplish its aims (Bontis,1998). The previous studies considered that OC was integrated with all kinds of intangible assets.

OC is considered to be a key mediating variable in the relationship between intangible assets such as HC and innovative capability (Huang et al 2011). Hence, it is a central requirement for innovative capabilities. OC represents the organizational infrastructure through which HC can create added value (Bontis, 2001;Chen, et al 2006). Strong organizational culture plays an important role in developing employees' competencies which contribute to satisfying the needs of their company and customers (Kim et al., 2012). Foss, Laursen and Pedersen, (2011) explained that, in the context of innovation, organizational practices, such as organizational structures, could sustain firms to develop their customers' knowledge. In the other words, organizational practices have the capabilities to absorb, from customers, the information and knowledge which support the decisions related to an innovation project.

In summary, HC, CC and SC may drive OC which, in turn, may reinforce the different types of innovations. It is necessary to have effective capitals; these should complement each other as a coherent system to support innovation through OC. Consequently, the researcher suggests the following hypotheses:

H5: OC mediates the relationship between HC and the two types of innovations.

H6: OC mediates the relationship between SC and the two types of innovations.

H7: OC mediates the relationship between CC and the two types of innovations.

2.8 Conceptual Model/ Framework

As can be seen in figure 2.1 below, independent variables are human, social and customer capital considered for components of intellectual capital as they are frequently used by intellectual capital researchers. Organizational capital was considered as a mediator between intellectual capital and innovations as suggested by authorities in the area as it has not been used before to study the relationship between intellectual capital and innovations. As suggested by Ahmed (2014), product and process innovations are appropriate for service sectors and the study used the two innovations as dependent variables.

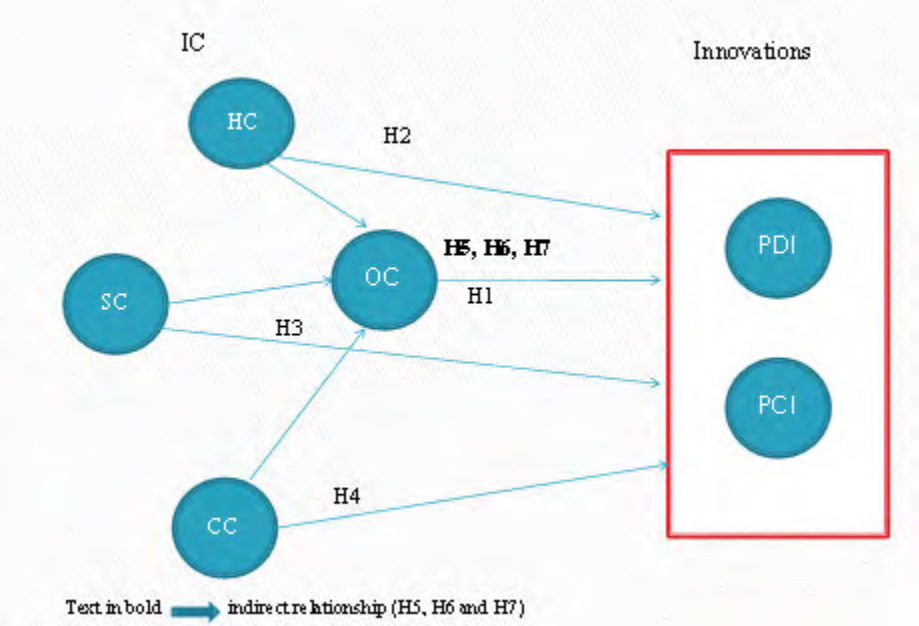

Figure 1: Conceptual Framework/Model

Source: Ahmed (2014)

Chapter Three: Research Design and Methodology

3.1. Introduction

This chapter is about the research methodology which is a systematic way to accomplish the research objectives or to solve the research problem. This chapter is structured as follows: Section 3.2 explains about research approach. Section 3.3 represents about research methods. Section 3.4 of this chapter is about research design which includes purpose of the research, research strategies, data collection, research measures, population, sampling, sampling frame, and sample size.

3.2 Research Approach

Deductive and induction approach can be identified by Saunders et al (2012). The study follows a deduction approach because the conceptual framework or research hypotheses are built based on the previous studies. A deduction approach adopts current theories and concepts to justify research relationships. Deductive approach is searching for an explanation of the causal relationships between variables by collecting data in most cases using a quantitative method. It helps in generalizing from the chosen sample to the whole population (Sekaran, 2003).

3.3 Research Method

As described by Creswell (2009), there are three common approaches to conduct a research project in the area of business and social sciences research namely; quantitative, qualitative, and mixed research approaches.

Quantitative method is an objective and systematic process in which pieces of numerical data are used to obtain information about the world and which are analyzed by using mathematical methods. Quantitative research was used to test a theory by identifying the variables based on the previous studies, examining the research relationships and obtaining the findings. Quantitative method can generalize research findings when the study collects data from a random sample which represents its population and it has sufficient sample size. Quantitative method can achieve greater objectivity and more accurate results. It depends on a few variables and it follows many tools in order to test the validity and reliability of the data (Kothari, 2004).

In order to achieve the objectives of this study and thereby to give answer for its problems, quantitative research approach was used due to appropriateness (Creswell, 2009).

3.4 Research Design

A research design is the preparation of conditions for the collection and analysis of the data required either to solve the research problem or to achieve the research purpose. There are three types of research namely; exploratory, descriptive, and explanatory research as follows (Kothari, 2004).

Explanatory research aims to answer the question why some variables have an effect on other variables or the explanatory research seeks to test a theory which is a set of logically organized and interconnected principles, rules, assumptions, statements and propositions which are employed to explain, describe and predict the phenomenon (Ahmed, 2014). Explanatory research attempts to go beyond the findings of exploratory research and descriptive research to understand the real reasons behind the phenomenon (Kothari, 2004; Saunders et al, 2009). It distinguishes between dependent and independent variables.

Accordingly, the present study uses explanatory research because it aimed to test the relationship between the dependent variables (innovation) and independent variables (IC).

3.4.1 Research strategies

Research strategies help researchers to provide data that can answer the research questions or achieve the research objectives. While some strategies are deductive (quantitative) in nature, many others are inductive (qualitative). There are many types of research strategies such as experiment, survey, case study, action research and grounded theory (Saunders et al, 2009).

The study uses survey strategy because the data collected from the survey strategy can be used to suggest a possible explanation of the relationship between the study's variables. Furthermore, the survey is the most relevant to the study which follows deduction approach and quantitative method (Saunders et al, 2012).

3.4.2 Data Collection

3.4.2.1 Types of Data

There are two types of data: primary data and secondary data. Primary data is collected for a specific issue. It could be either qualitative such as interviews, semi-structured or unstructured; focus groups; observations; and case studies, or it could be quantitative such as questionnaires; and structured interview (Saunders et al, 2012). Based on the research questions and objectives, this study used primary data.

3.4.2.2 Data Collection Technique

The study used questionnaire as it is more suitable for descriptive or explanatory research and is inappropriate to exploratory research which requires many open-ended questions (Saunders et al, 2009). Hence, this study collected data using a questionnaire because the present study is an explanatory research. Data from Ethiopian commercial banks wascollected using self-administered questionnaires which are hand-delivered and hand-collected.The questionnaire was compiled from instruments of previous researchers.

3.4.3 Research Measures

This section outlines both the dependent and independent variables for this study and their measurement. The independent variables are intellectual capital components which include human, customer and social capital. The mediator is organizational capital and the dependent variables are innovations which include process and product innovations. Each constructwas measured with multi-item scales which are developed to be appropriate to the banks. These items were extracted from previous researchers. Items are measured on a five-point Likert-type scale ranging from “1= strongly disagree” to “5 = strongly agree”.

3.4.4 Study Population, Sampling, Sampling Frame, and Sample size

3.4.4.1 Study population

The population used for this study isbranch managers of 17 Ethiopian commercial banks located in Addis Ababa, capital city of Ethiopia as we can get all banks with their many branches in the city and no need to go out of the city since branches of each bank are doing similar activities. On top of this, it is convenient for the researcher in terms of time, cost and accessibility as the researcher is living in the city. According to National bank of Ethiopia updated on March 2016, there are a total of 946 branches that all commercial banks are having in the city. The respondents are branch managers because they are responsible for strategic decisions at the corporate level and the strategic business unit level, and therefore they are in the best position to describe the various organizational characteristics of their banks (Mahmood and Abd Wahid, 2012). Furthermore, this study focuses more on the organizational capabilities that are more closely related to management. Thus, collecting information from the managers would well support the focus of this study.

3.4.4.2 Sampling

Random sampling technique was used because such a sampling technique avoids researcher bias in selecting the sample and improves the external validity of the research. Simple and stratified random sampling techniques were used.

Simple random sampling was used because of the following reasons: first, it completely avoids the researcher's bias. Second, eventually it produces a random result. Thirdly, managers of the bank almost perform similar activities. Stratified random sampling was also used because there are about 17Ethiopian commercial banks and data needs to be collected from each bank considering each bank as strata. Sample was selected from each bank proportionally that is; depending on the number of branches each bank has in the population.

3.4.4.3 Sampling Frame

Sampling frame of this study is list of branches of each bank located in Addis Ababa city. According to national bank of Ethiopia, last updated on March 2016, 17 commercial banks have a total of 946 branches in Addis Ababa city. So, names of each bank's branches were listed by name and sample was selected randomly considering each bank as a strata.

3.4.4.4 Sample Size

Since the model has a mediating variable and more than one dependent variable, the study employed structural equation modeling (SEM) to test its hypothesesThe SEM fit model depends mainly on the sample size and it helps support the sufficient statistical power and precision of the parameter estimates in an SEM research and in order to apply SEM the sample size should involve at least 100 to 200 (Ahmed, 2014).

When the target population size is known, Yamane's (1967) provides a simplified formula to calculate sample size. His formula will be used and it is presented as follows.

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

Where,
n= sample size
N= population size
e= the desired level of precision
Krejcie and Morgan, (1970) suggest that for business and social science research a confidence level of 95 percent, margin of error ± 5 percent is acceptable. So based on Yamane's formula sample size is determined as follows.

$$n = \frac{946}{1+946*0.05^2} \approx 282$$

Table 1 shows the details of the sample frame. The third column (sub population) indicates the number of branches each bank has in Addis Ababa city where as the forth column indicates the number of branches selected from each bank.

Table 1: Sample Frame

No.	Name of the Bank	Sub Population	To be distributed	Collected
1	Abay Bank	23	7	5
2	Addis International Bank	26	8	6
3	Awash International Bank	106	32	28
4	Bank of Abyssinia	70	21	20
5	Birhan International Bank	39	12	11
6	Buna International Bank	31	9	6
7	Commercial Bank of Ethiopia*	233	70	51
8	Cooperative Bank of Oromia	37	11	8
9	Dashen Bank	82	24	19
10	Debub Global Bank	14	4	4
11	Enat International Bank	11	3	2
12	Lion International Bank	38	11	10
13	Nib International Bank	66	20	18
14	Oromia International Bank	44	13	12
15	United Bank	65	19	17
16	Wegagen Bank	54	16	16
17	Zemen Bank	7	2	2
	Total	**946**	**282**	**235**

* Commercial bank includes the formerly construction and business banks branches

Chapter Four: Results and Discussions

4.1 Introduction

The chapters begins with data screening and cleaning via different tests and check the usual tests of multiple regression, test construct validity (both convergent and discriminate validity) using measurement model and finally test the proposed hypothesis using structural model and presents the discussion of the results. Finally it tries to draw conclusions and forward recommendations based on the empirical results of the study.

4.2 Data Screening and Testing

4.2.1 Questionnaire Pilot Testing

A pilot study was conducted prior to the beginning of the full study. The objective of the pilot study was to establish that the respondents understand the questions in the survey, to solicit feedback for improvements to the instrument and also assesses the validity and reliability of the questions (Saunders et al., 2009). The responses showed the general ease of completion of the questionnaire, and there were no comments or improvement suggestions from the respondents. Therefore, no further adjustments were needed. In addition, a reliability test was conducted to examine the internal consistency of the instruments employed in this study. Cronbach's alpha ought to be above 0.70 (Hair et al., 2010). The result of the pilot study is presented in the table below in that all variables Cronbach's alpha was above 0.7.

Table 2: Pilot test result of the instrument

Constructs	No. of items proposed	No. of items dropped	No. of items retained	Cronbach's alpha
Human capital (HC)	9	2	7	0.822
Social capital (SC)	11	3	8	0.765
Customer capital (CC)	8	2	6	0.858
Organizational capital (OC)	4	-	4	0.789
Product innovation (PDI)	4	-	4	0.857
Process innovation (PCI)	7	1	6	0.798

4.2.2 Validity

Validity refers to the extent to which an instrument measures what it is supposed to measure (Bryman and Bell, 2007). A measure's validity relies on the definitions of the variable which is used to design the measure. There are different types of validity such as content, external, construct (convergent and discriminant) validity. The questionnaire was evaluated by respondents (bank managers), and university lecturers and they responded that the contents included in the questionnaire were good and easy to understand implying that the instrument fulfills content or face validity. The questionnaire has adequate sample size to make inference about the population as a result it fulfils external validity or the study can generalize about the population based on the sample. Convergent and discriminant validity are assessed in the measurement model of confirmatory factor analysis using Amos version 20.

4.2.3 Testing for Non-Response Bias

The study distributed 282 and actually collected 235 usable questionnaires (response rate of 83%) as a result, there is a need to check whether 83% response is enough to go through the analysis or not.

Accordingly, non-response bias was tested based on comparison of the pattern of 'early' and 'late' respondents on selected variables of the study assumed to motivate respondents to give their response to the survey by taking 47 early (20% of the data) and 47 late (20%) respondent's response and the results showed that for almost all of items (97.81%) there was no significant difference between the late and early respondents ($p > .05$) indicating that non-response bias was not a problem for the data.

4.2.4 Profile of Respondents

The findings in table below revealed that nearly 79 percent of bank managers holding the position at branch levels were male. Most of the respondents (64.4%) possessed an undergraduate degree and the rest 35.6% possessed masters' degree. Of the total respondents, 74.58% were private bank managers and the rest 25.42% were public bank managers.

Table 3: Profile of the Respondents

Variable	Category	Frequency	Percentage
Gender	Male	186	79.15
	Female	49	20.85
Bank type	Public	51	21.70
	Private	184	78.30
Academic Qualification	First Degree	151	64.26
	Masters	84	35.74

4.2.5 Assessing the Sample Size

The researcher adopted structural equation modeling using confirmatory factor analysis to reach at the final research results. The sample size affected the accuracy of all the statistical estimates. The sample size should involve at least 100 to 200 cases in order to conduct structural equation modeling (Loehlin, 2004). The sample size used for this study was 235 which are enough to go through structural equation modeling.

4.2.6 Missing Value Analysis

Missing data refers to a situation in which valid values on one or more variables are not available for analysis (Hair et al. 2010). Missing data may cause the following two negative effects on the research results: (1) it may produce biased estimates' and (2) it reduces the model's fit (Ahmed 2014).

Hair et al, (2010) reported that variables or cases ought to be omitted if they had 50% or more missing data. Therefore, the researcher omitted 6 cases. The number of responses was reduced from 241 to 235 usable questionnaires which are enough to run structural equation modelling.

4.2.7 Examination for Outliers

Outliers refer to cases or observations with values for variables or combinations of variables that are substantially different from those in other cases or observations (Byrne 2010; Hair et al.

2010). Outliers can be said not to be representative of the population. They can distort statistical tests, and thus work counter to the objectives of a research study.

In order to find univariate outliers, the researcher used the frequency distributions of z scores. If the Z score is greater than 3.29 with p< .001, it indicates that there is a univariate outlier (Tinsley and Brown, 2000). Accordingly, based on the previous rule, there were some outlier cases (2.25% of the data point) in this study.

There are two common techniques of dealing with outliers namely trimming and winsorizing. Trimming is eliminating data points from analysis usually done when data is out of range or entry error and winsorizing is assigning outlier the next higher or lower value found in the sample that is not an outlier done when small amounts of scores are legitimate outliers. Trimming or winsorizing less than 5% of the data points will not likely affect the hypothesis testing outcome (Rocky Mountain University, 2015). Winsorizing techniques was applied because all the outliers were legitimate and after that all outliers were completely cleaned from the original data set.

4.2.8 Assessing Linearity Assumption

The study conducted curve estimation for all the relationships in the model and all the relationships were sufficiently linear to be tested using a covariance based structural equation modeling algorism.

4.2.9 Assessing Multicolinearity Assumption

Widely used technique of identifying the existence of multicollinarity is calculating variance inflation factor (VIF) between all independent variables). A rule of thumb of collinearity VIFs is 3.3 or lower to suggest no multicollinearity in the model (Kock, 2013).

As can be seen in table above, the study calculated VIF for all independent variables in SPSS and the results revealed that all of the VIF results are below the threshold of 3.3 indicating there is no multicollinearity problem for the data.

Table 4: Statistics of Multicollinearity Test

No.	Independent Variable	VIF
1	Social Capital	1.000
2	Human Capital	1.000
3	Customer Capital	1.325

4.2.10 Assessing Normality Assumption

Normality focuses on the extent to which the sample data distributes according to normal distribution (Hair et al., 2010). The researcher used skewness and kurtosis to evaluate the normality of the observed items. Skewness is "a measure of the asymmetry of the probability distribution of a real-valued random variable". On the other hand, kurtosis refers to "the peaked or flatness of the distribution compared to the normal distribution" (Landau and Everitt, 2003). As a rule of thumb, the values of skewness and kurtosis should be between -1 and +1 in order to obtain a reasonably normal distribution (Bachman, 2004).

The study examined the indicators' univariate kurtosis and skewness and the values of skewness and kurtosis were well within their respective rule-of-thumb ranges (between -1 and 1) which provided support for univariate normality.

4.2.11 Factor Analysis

Factor analysis is the oldest and best-known statistical technique for explaining the relationship between a set of observed and construct variables (Tinsley and Brown, 2000; Byrne, 2010). Factor analysis can be used for different purposes. Firstly, through calculating the factor loading, factor analysis can be employed for evaluating the validity of measurements. Secondly, factor analysis can be used to confirm or develop a theory through investigating the observed variables which belong to latent ones (unobserved variables). Thirdly, factor analysis is used to produce a smaller group of latent variables which consist of a larger set of observed variables (manifest variables) (Thompson, 2004; Albright and Park, 2009; Field, 2009).

Factor analyses are divided into two types. Firstly, Exploratory Factor Analysis (EFA) is described as the early stages of research to discover the interrelationships between a set of

observed variables (Carrington, 2009). EFA is designed to explore the relationship between observed and latent variables when this relationship is uncertain or unknown. Therefore, it aims to determine the degree to which the observed variables are linked to their fundamental factors (latent variables). It is designed only to suggest and not to confirm groups or dimensions.

As the relationship between observed and latent (unobserved) variables of this study was tested in others research work therefore there is no need to conduct exploratory factor analysis as the study aimed at confirming the relationship between latent variables.

4.2.12 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) is a more complex set of techniques than EFA which is used to confirm specific hypotheses when the researcher knows that these measures correlate with the latent variable (Carrington, 2009). Based on a theory, the researcher suggests relationships (hypothesized structure) between the observed items and their factors which are tested statistically (Byrne, 2010). The study conducted confirmatory factor analysis using Amos version.

There are broad ranges of analytical tools available to analyze quantitative research results. As a second generation data analysis technique, structural equation modeling (SEM) stands out by offering benefits not provided by first generation statistical techniques such as correlation analysis, exploratory factor analysis, multiple regression, discriminant analysis, analysis of variance or logistic regression (Bagozzi and Yi 2012; Haenlein and Kaplan 2004). SEM has the ability to evaluate latent variables in the measurement model and simultaneously test multiple relationships of latent variables in the structural model. Factor analysis and hypotheses are tested in the same analysis, hence providing a more rigorous analysis of the proposed research model (Gefen et al, 2000).

Structural equation modeling (SEM) is defined as “a statistical method that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon”. This theory represents “causal” processes which generate observations on multiple variables (Byrne, 2010). SEM aims to test the relationships between one or more independent and dependent variables by assessing the extent to which the hypothetical constructs

are suitable or fit with the obtained data. These variables may be measured (manifest or observed) or latent. The observed variable, such as income, heart rate or weight, is measured directly whilst the latent variable is not measured directly but through two or more observed variables, for instance, buying behavior or personality (Kline, 2005). In achieving the results, a SEM analysis has many stages.

When researches have complex relationships with multi-dimensions, SEM can test all these relationships simultaneously. SEM is considered to be the only statistical technique to perform this analysis (Hair et al, 2010). SEM is used to test a theory. SEM cannot work properly without prior knowledge. This means that a conceptual framework or relationships between variables must be built based on an extensive literature review (Tabachnick and Fidell, 2001).

This study conducted SEM process using Analysis of Moment Structures (AMOS) version 20.0 for both measurement and structural models.

4.2.12.1 Measurement Model

The main purpose of using SEM to assess the measurement model is to find the most parsimonious model which is well fitting and valid. A measurement model is employed to evaluate construct validity in terms of convergent and discriminant validity to discover the extent to which the measures have adequate internal consistency by conducting the necessary tests and the acceptance levels for goodness of fit. The full structural model will then only be valid and reliable when the measurement model is based on theory and well defined constructs, so that the subsequent structural model is based on a solid theoretical foundation (Paschke, 2009).

Construct Validity

Once the factor structure underlying each of the theorized research constructs was determined through EFA, it was necessary to assess construct validity further through CFA before assessing the structural model and testing the research hypotheses (Byrne, 2010; Hair et al, 2010). A critical consideration in using the CFA is sample size. A sample size above 200 is generally considered ‘good’ (Hair et al, 2010). Since the valid sample size for this study is 235, it meets

the requirement. Construct validity assesses convergent and discriminant validity tests and these are presented below.

Convergent Validity

Convergent validity measures whether items of the same latent factor share a proportion of variance (Hair et al, 2006). Convergent validity is, therefore, a direct measure of the extent of the relationship between an observed variable and a latent construct.

Convergent validity is assessed through a variety of measures: firstly, with standardized regression loadings of higher than 0.5 (Hair et al, 2006); secondly, with significant p-values (at 95% confidence interval) (Anderson and Gerbing, 1988; Hair et al, 2006) and critical ratios outside the -1.96 to +1.96 z-ranges; and finally, SMC values below 0.4 are considered not to hold convergent validity. SMC values between 0.4 and .05 were scrutinized and accepted if all other convergent validity measures were well above the recommended thresholds. SMC above 0.5 were accepted. The standardized factor loadings, the critical ratio, p-value and SMC of each item are displayed for the measurement model table.

Discriminant validity

Discriminant validity measures to what extent latent variables differ from each other. In contrast to convergent validity, which is a measure within latent variables, discriminant validity is a measure between variables. Discriminant validity can be assessed based on correlations between different constructs. High correlations (above 0.8 or 0.9) between constructs indicate a lack of discriminant validity (Holmes-Smith 2007).

Goodness of Fit

Whether a measurement model is considered valid is dependent on goodness of fit (GOF) indices. GOF indices indicate how well the model reflects the data, in other words, how well the specified model reproduces the covariance matrix among the indicator items (Hair et al. 2006).

This study follows the advice by Weston and Gore, (2006); MacCallum and Austin, (2000); Hu and Bentler, (1998) and McDonald and Ho, (2002) and presents the following fit indices: chi-square, normed chi-square, RMSEA, RMR and CFI.

Table 5: Category of GOF Indices

(Adopted from Asmare, 2012)

Category	GOF indices	Definition
Chi-Square (X^2)	Chi-Square	Difference between observed and estimated covariance matrices
	Degrees of freedom	Covariance in the observed matrix less the number of estimated coefficients
	Probability statistic (p-value)	Probability that the observed and estimated covariance matrices are actually equal
Absolute fit measures	GOF index	Measure indicating how well a model reproduces the variance/covariance matrices of the observed sample
	Root mean square error of approximation (RMSEA)	Badness-of-fit index measuring how well a model fits a population taking into account both model complexity and sample size
	Root mean square residual (RMSR)	Average of the residuals between individual observed and estimated covariance and variance terms
	Standardized root mean residual (SRMR)	Standardized value of RMSR
	Normed chi-square	Ration of chi-square to degrees of freedom for a model
Incremental fit indices	Normed fit index (NFI)	Assesses how well a specified model fits relative to some alternative baseline model (often a null model that assumes all observed variables are uncorrelated)
	Comparative fit index (CFI)	
	Tucker-Lewis index (TLI)	
	Incremental fit indices (IFI)	
Parsimony fit indices	Parsimony comparative fit index (PCFI)	Evaluates the parsimony ratio of the model compared to the GOF such as CFI and NFI

Hair et al, (2010) recommend that in addition to the chi-square (X^2) value and degrees of freedom, at least one incremental index (CFI or TLI) and at least one absolute index (RMSEA or SRMR) should be reported. The sample size for this study is 235 respondents and the number of

observed variables is greater than 30. Taking in to account the sample size and the number of observed variables used in the study as recommended by Hair et al, (2010), this study evaluates model fit based on selected fit measures as summarized in Table 6below.

Table 6: Summary of Selected Fit Measures and Established Criteria

Category	Statistics	Abbreviation	Acceptable level
Chi-Square	Chi-square (with df, p)	x2 (df, p*)	p-value can be less than .05
Absolute fit indices	Normed chi-square	x2 /df	Value between 1 and 5
	Root mean-square error of approximation	RMSEA	Values < .08/.10
	Root mean-square residual	RMR	Values < .09
Incremental fit indices	CFI, Tucker Lewis index, Incremental fit index	CFI, TLI, IFI	Values >= .90 and sample size
Parsimony fit indices	Parsimony normed fit index (PNFI), Parsimony	PNFI, PCFI	Values >= .5

Source: Hair et al, (2010)

Model Re-specification Considerations: A model is said to be correctly specified when it reproduces the sample covariance matrix well. When instances of specification error are noticed, the critical ratios (t-values), the squared multiple correlations (SMC) values, the standardized residuals and the modification indices (MI) were examined to re-specify the model. SMC values should be greater than 0.5. Standardized residual covariance should also be less than the benchmark value of |4| but preferably less than |2.58| (Hair et al, 2010). A large residual covariance between any two measurement items indicates that the association between these two items is not accounted for sufficiently by the model. This suggests a problem with one or both of the measurement items. A standardized residual value of |2| indicates that a particular covariance is not well reproduced by the hypothesized model (at $\alpha = 0.05$ significance level) and a standardized residual value of |4| relates to $\alpha = 0.001$ significance level. When a consistent pattern of large standardized residuals is associated with either a single item or several of the items within the factor, the necessary re-specification was made to account for this association

between the variables, such as by dropping an item and re-running the measurement model (Hair et al, 2010).

MI also suggests a potential source of model re-specification. A MI is calculated for each non-free parameter and represents a possible decrease in X^2 if the parameter is freely able to be estimated in the re-specified model. A chi-square of 3.84 with one degree of freedom has a p = 0.05 and a MI value greater than |4| suggests that the chi-square could be significantly reduced if the corresponding parameter were estimated. Based on this guideline, this study examined the measurement items that reveal high MI; that is, above |4| (Byrne, 2010; Hair et al, 2010), and made appropriate re-specification to the model.

Table 7: Proposed Latent variables and observed variables for CFA

No.	Latent variables (unobserved variables)	No. of Indicators(observed variables)
1	Human Capital(HC)	7
2	Social Capital(SC)	8
3	Customer Capital(CC)	6
4	Organizational Capital (OC)	4
5	Product Innovation(PDI)	4
6	Process innovation(PCI)	6

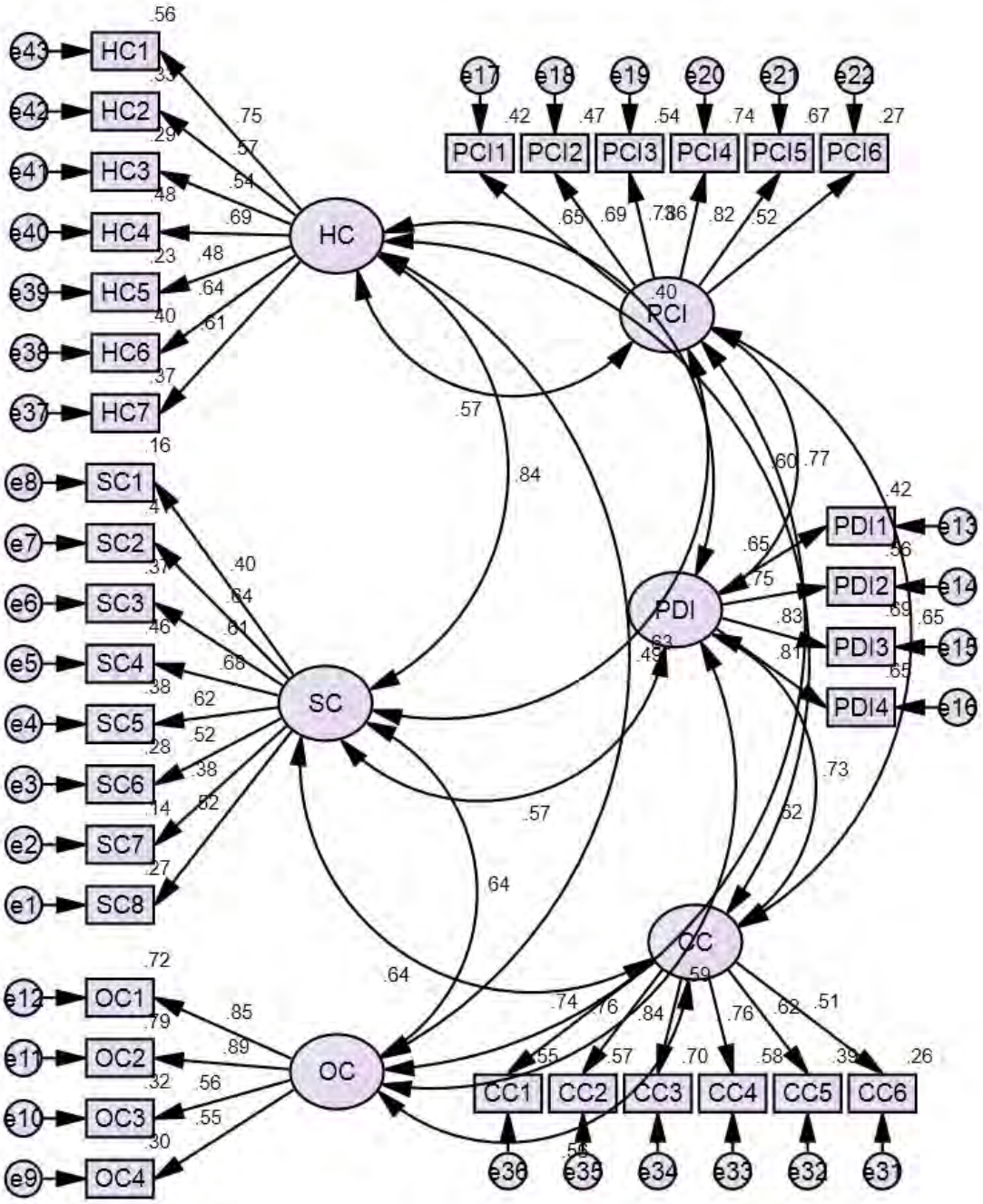

Figure 2: Proposed Structural Model

(Source: researcher Amos output)

Examination of the GOF statistics is summarized in table below and reveals that the proposed measurement model is inadmissible.

Table 8: GOF indices for measurement model

Chi-square		Absolute Fit Indices		Incremental Fit Indices		Parsimony Fit Indices	
X^2 (p-value)	997.28(.000)	RMSEA	.06	CFI	.878	PCFI	.804
DF	545	RMR	.053	IFI	.879	PNFI	.703
X^2/DF	1.83			TLI	.867		

Source: researcher Amos output

As can be seen in the table above X^2/DF is 1.83 which is within the range (between 1 and 5). RMSEA and RMR are 0.06 and 0.053 both are within the acceptable range. PCFI and PNFI are .804 and .703 both are within the range of acceptable. But CFI, IFI and TLI are .878, .879 and .867 respectively which are below the acceptable cutoff (above .9).

The table below also indicates convergent validity of the constructs. But some items are below the acceptable threshold. These include; SC8, SC7, SC6, SC5, SC1, HC5, HC3, HC2, CC6, CC5, OC4, OC3 and PCI6. They need to be dropped because their squared multiple correlation (SMC) values are below 0.4. As a result the model becomes inadmissible and the model needs rerun after deleting the above 13 items.

Table 9: Convergent validity test of measurement model

	Estimate	SMC	S.E.	C.R.	P	Comment
SC8 <--- SC	.519	0.269				Convergent validity doesn't hold
SC7 <--- SC	.376	0.141	.169	4.767	***	Convergent validity doesn't hold
SC6 <--- SC	.525	0.276	.190	6.092	***	Convergent validity doesn't hold
SC5 <--- SC	.618	0.382	.165	6.751	***	Convergent validity doesn't hold
SC4 <--- SC	.679	0.461	.149	7.114	***	Convergent validity hold
SC3 <--- SC	.608	0.370	.185	6.684	***	Convergent validity hold

			Estimate	SMC	S.E.	C.R.	P	Comment
SC2	<---	SC	.638	0.407	.161	6.877	***	Convergent validity hold
SC1	<---	SC	.397	0.158	.175	4.976	***	Convergent validity doesn't hold
OC4	<---	OC	.546	0.298				Convergent validity doesn't hold
OC3	<---	OC	.563	0.317	.149	6.747	***	Convergent validity doesn't hold
OC2	<---	OC	.889	0.790	.156	8.670	***	Convergent validity hold
OC1	<---	OC	.848	0.719	.158	8.551	***	Convergent validity hold
PDI1	<---	PDI	.647	0.419				Convergent validity hold
PDI2	<---	PDI	.747	0.558	.121	9.610	***	Convergent validity hold
PDI3	<---	PDI	.832	0.692	.127	10.398	***	Convergent validity hold
PDI4	<---	PDI	.805	0.648	.129	10.167	***	Convergent validity hold
PCI1	<---	PCI	.647	0.419				Convergent validity hold
PCI2	<---	PCI	.688	0.473	.121	9.117	***	Convergent validity hold
PCI3	<---	PCI	.734	0.539	.136	9.611	***	Convergent validity hold
PCI4	<---	PCI	.858	0.736	.127	10.816	***	Convergent validity hold
PCI5	<---	PCI	.817	0.667	.132	10.445	***	Convergent validity hold
PCI6	<---	PCI	.516	0.266	.106	7.114	***	Convergent validity doesn't hold
CC6	<---	CC	.508	0.258				Convergent validity doesn't hold
CC5	<---	CC	.621	0.386	.170	6.816	***	Convergent validity doesn't hold
CC4	<---	CC	.760	0.578	.179	7.571	***	Convergent validity hold
CC3	<---	CC	.837	0.701	.200	7.891	***	Convergent validity hold
CC2	<---	CC	.758	0.575	.161	7.560	***	Convergent validity hold
CC1	<---	CC	.744	0.554	.181	7.494	***	Convergent validity hold
HC7	<---	HC	.611	0.373				Convergent validity hold
HC6	<---	HC	.635	0.403	.143	7.876	***	Convergent validity hold

	Estimate	SMC	S.E.	C.R.	P	Comment
HC5 <--- HC	.484	0.234	.147	6.331	***	Convergent validity doesn't hold
HC4 <--- HC	.693	0.480	.154	8.392	***	Convergent validity hold
HC3 <--- HC	.542	0.294	.167	6.950	***	Convergent validity doesn't hold
HC2 <--- HC	.572	0.327	.133	7.261	***	Convergent validity doesn't hold
HC1 <--- HC	.749	0.561	.137	8.856	***	Convergent validity hold

Source: researcher Amos output

A row with blank space indicates a default indicator

Model Fit: Inadmissible

Table 10: Discriminant validity of measurement model

Variable	<-->	Variable	Correlation	Comment
SC	<-->	OC	.644	Discriminant validity holds
SC	<-->	PDI	.568	Discriminant validity holds
SC	<-->	PCI	.633	Discriminant validity holds
SC	<-->	CC	.636	Discriminant validity holds
SC	<-->	HC	.839	Discriminant validity holds
OC	<-->	PDI	.590	Discriminant validity holds
OC	<-->	PCI	.622	Discriminant validity holds
OC	<-->	CC	.564	Discriminant validity holds
OC	<-->	HC	.494	Discriminant validity holds
PDI	<-->	PCI	.769	Discriminant validity holds
PDI	<-->	CC	.732	Discriminant validity holds
PDI	<-->	HC	.396	Discriminant validity holds
PCI	<-->	CC	.650	Discriminant validity holds
PCI	<-->	HC	.570	Discriminant validity holds
CC	<-->	HC	.601	Discriminant validity holds

Source: researcher Amos output

The table above shows discriminant validity of the model. As can be seen in the table the model fulfills discriminant validity as the correlation among all latent variables is within the acceptable threshold (below .9).

The model was rerun after by dropping the above 13 indicators of different latent variables to ensure convergent validity and improve the model's goodness of fit indices.

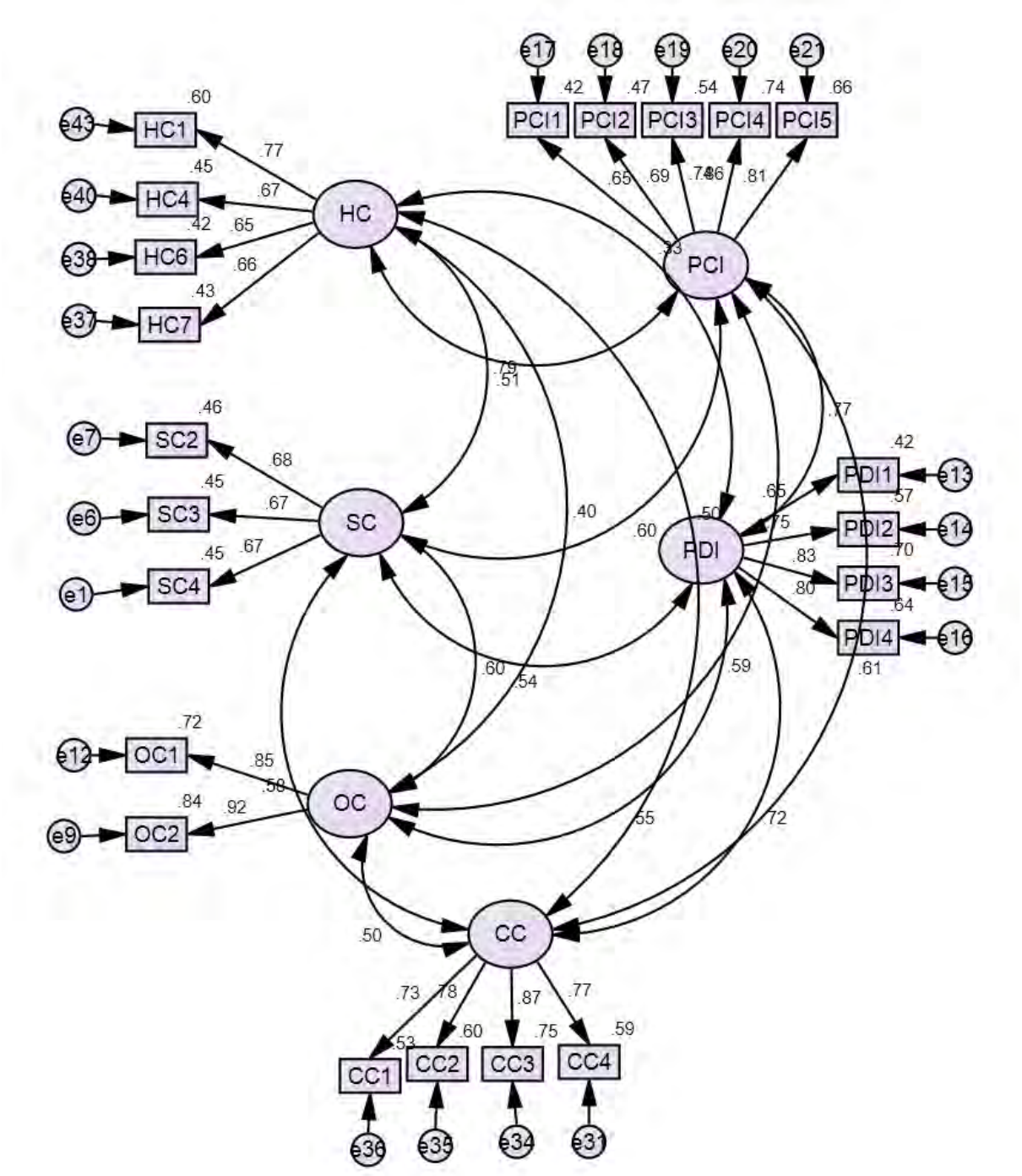

Figure 3: Revised and final measurement model

(Source: Amos output)

Table 11: GOF indices for re-specified final measurement model

Chi-square		Absolute Fit Indices		Incremental Fit Indices		Parsimony Fit Indices	
X^2 (p-value)	345.33(.000)	RMSEA	.058	CFI	.942	PCFI	.791
DF	194	RMR	.039	IFI	.943	PNFI	.738
X^2/DF	1.78			TLI	.931		

Source: researcher Amos output

Table 12: Convergent validity of re-specified final measurement model

	Estimate	SMC	S.E.	C.R.	P	Comment
SC4 <--- SC	.668	0.446				Convergent validity holds
SC3 <--- SC	.671	0.450	.157	8.359	***	Convergent validity holds
SC2 <--- SC	.679	0.461	.134	8.436	***	Convergent validity holds
OC2 <--- OC	.915	0.837				Convergent validity holds
OC1 <--- OC	.851	0.724	.076	12.932	***	Convergent validity holds
PDI1 <--- PDI	.645	0.416				Convergent validity holds
PDI2 <--- PDI	.753	0.567	.122	9.635	***	Convergent validity holds
PDI3 <--- PDI	.834	0.696	.128	10.378	***	Convergent validity holds
PDI4 <--- PDI	.799	0.638	.130	10.073	***	Convergent validity holds
PCI1 <--- PCI	.645	0.416				Convergent validity holds
PCI2 <--- PCI	.689	0.475	.122	9.084	***	Convergent validity holds
PCI3 <--- PCI	.738	0.545	.137	9.598	***	Convergent validity holds
PCI4 <--- PCI	.860	0.740	.128	10.753	***	Convergent validity holds
PCI5 <--- PCI	.813	0.661	.133	10.337	***	Convergent validity holds
CC4 <--- CC	.767	0.588				Convergent validity holds
CC3 <--- CC	.866	0.750	.089	13.458	***	Convergent validity holds
CC2 <--- CC	.776	0.602	.076	12.020	***	Convergent validity holds

			Estimate	SMC	S.E.	C.R.	P	Comment
CC1	<---	CC	.727	0.529	.087	11.181	***	Convergent validity holds
HC7	<---	HC	.659	0.434				Convergent validity holds
HC6	<---	HC	.645	0.416	.130	8.166	***	Convergent validity holds
HC4	<---	HC	.668	0.446	.138	8.396	***	Convergent validity holds
HC1	<---	HC	.772	0.596	.125	9.281	***	Convergent validity holds

Model fit: Admissible

Table 13: Discriminant validity of re-specified final measurement model

Variable	<-->	Variable	Correlation	Comment
SC	<-->	OC	.596	Discriminant validity holds
SC	<-->	PDI	.536	Discriminant validity holds
SC	<-->	PCI	.597	Discriminant validity holds
SC	<-->	CC	.582	Discriminant validity holds
SC	<-->	HC	.790	Discriminant validity holds
OC	<-->	PDI	.548	Discriminant validity holds
OC	<-->	PCI	.595	Discriminant validity holds
OC	<-->	CC	.496	Discriminant validity holds
OC	<-->	HC	.404	Discriminant validity holds
PDI	<-->	PCI	.768	Discriminant validity holds
PDI	<-->	CC	.722	Discriminant validity holds
PDI	<-->	HC	.328	Discriminant validity holds
PCI	<-->	CC	.607	Discriminant validity holds
PCI	<-->	HC	.507	Discriminant validity holds
CC	<-->	HC	.497	Discriminant validity holds

Source: Amos output

As can been seen from the above three consecutive tables the model becomes fit. These are because of the following reasons. First, goodness of fit indices of X^2/DF is 1.78 which is within the range (between 1 and 5). RMSEA and RMR are 0.058 and 0.039 both are within the acceptable range. PCFI and PNFI are .791 and .738 both are within the range of acceptable. But CFI, IFI and TLI are .942, .943 and .931 respectively which are within the acceptable cutoff (above .9). Second, construct validity is perfect i.e. both convergent validity is valid (all indicators squared multiple correlation is above 0.4) and discriminant validity also holds true (the correlation among latent variables is below 0.9).

Final Instrument Reliability

After all the measurement factors underlying the research constructs have been empirically derived and validated, the instrument is checked for reliability before proceeding with the structural model (Lewis et al, 2005).

Hair et al, (2010), recommends a Cronbach's Alpha value of 0.7 or above for consistency or reliability test. Table below displays the reliability estimates of each of the variables; they are all above 0.7, which satisfies the recommended threshold in the literature. Thus, the measurement instrument was reliable.

Table 14: Final Reliability

Constructs	Number of Items	Cronbach's Alpha
HC	4	.779
SC	3	.712
CC	4	.860
OC	2	.875
PDI	4	.840
PCI	5	.863

4.2.12.2 Structural Model

The structural model can be tested only after adequate measurement and construct validity are established, as measurement model is the groundwork for the structural model. Hence, this section reports on the tests of the structural model.

The validity and acceptability of the structural model can be evaluated in terms of (1) model fit, that is, GOF indices; (2) the magnitude of variance explained, that is, R^2; and (3) the size, direction and significance of the estimated structural parameters. Table below provides a description of the above tests and the rule of thumb criteria for what constitutes as acceptable value based on recommendations of SEM literature.

Table 15: Tests for Structural Model Validity

Test	Description	Acceptable values
Structural model fit	Assesses extent of the structural model fit of the sample data using the GOF indices used for the measurement model	Similar to measurement model
Comparison of loadings of the structural model and the measurement model	Assesses closeness of the parameter loadings of the structural and measurement models	Difference in loading should be 0.05 or less
Variance explained (R^2)	Extent to which variance is explained by the estimates of the model	0.70 and above = great; 0.50 and above = very good
Size and significance of parameter estimates	Significance of the parameter estimates based on the corresponding p-values	$p<0.05$ and/or t-value above 2.00

Source: Hair et al. (2006) and Kline (2010)

Table 16: Criteria 1: model fit, that is, GOF indices

Chi-square		Absolute Fit Indices		Incremental Fit Indices		Parsimony Fit Indices	
X^2	174	RMSEA	.044	CFI	.974	PCFI	.771
DF	121	RMR	.031	IFI	.974	PNFI	.728
X^2/DF	1.443			TLI	.967		

The model's normed chi-square (X^2/DF), 1.443, is within the acceptable range (between 1 and 5). All the incremental fit indices of CFI, IFI and TLI meet the lower threshold value of 0.9. The model's absolute fit index value is also within the recommended range in terms of RMSEA (0.044). Regarding RMR (0.031), the result is within the threshold value. Further, the model's parsimony fit indices values are acceptable in terms of PCFI and PNFI, which show relatively higher value than the corresponding measurement model. Hence, structural model is supported and accepted in terms of the selected fit indices in SEM literature.

Criteria 2: the magnitude of variance explained, that is, R^2

Second, assessment of the structural model's validity is examined through the extent of the variance in product and process innovations, the ultimate dependent (endogenous) variables, which the model explains. The model explains 83%, 82% and 53% of the variance ($R^{2)}$ in organizational capital, product and process innovations respectively, which is very good (Chin, 1998). This result further supports the validity of the structural model.

Criteria 3: Significance of the estimated structural parameters

The third set of criteria for assessing the validity of the structural model is investigating the size, direction and significance of the structural parameter estimates. Table below presents the structural path estimates and of the total of eleven paths only three are insignificant (p value above 0.05) and the rest eight are statistically significant. The first three paths are not part of the research's hypotheses but needed to check indirect effect of intellectual capital on innovations.

4.2.13: Direct effect of IC on Innovations

Table 17: Statistics for direct Effects of IC on Innovations

			Estimate	S.E.	C.R.	P
OC	<---	HC	.124(b1)	.062	2.010	.001
OC	<---	SC	.356(b2)	.167	2.123	.006
OC	<---	CC	.243(b3)	.078	3.120	.008
PCI	<---	HC	.251	.077	3.233	***
PDI	<---	HC	-.013	.062	-.211	.745
PCI	<---	SC	-.302	.119	-2.522	.001
PCI	<---	CC	.323	.155	2.081	.023
PDI	<---	CC	.190	.173	1.095	.359
PDI	<---	SC	.223	.173	1.278	.201
PCI	<---	OC	.455	.106	4.551	***
PDI	<---	OC	.241	.089	2.701	.002

*** indicating P<0.001

4.2.14 Meditational Effect of OC

Mediation analysis was performed to test the mediating effect of organizational capital between intellectual capital and innovations. The effect of the independent variable X (or exogenous construct) on a mediator M is represented by ***a***. The effect of the mediator on dependent variable Y (or endogenous construct) is represented by ***b.*** M is regarded as a third variable or an intermediary variable in the link between X and Y (Fairchild and McQuillin, 2010). Therefore, the indirect effect is a product term of ***a x b***. While, the total effect of X and Y relationship includes two parts that are the direct effect of X on Y represented by ***c*** and the indirect effect of X on Y through M (***a x b***). Total effect of X on Y is ***c' = (axb) + c***.

Zhao et al, (2010) suggest three factors that researchers need to take into consideration to testing mediation. First, researchers should use the size of an indirect effect to measure the strength of the mediation effect. Second, the only requirement for determining a mediation effect is the significance of an indirect effect. Finally, a bootstrap test (Preacher and Hayes, 2004) should be used to test the significance of the indirect path. Bootstrapping is regarded as a more rigorous and powerful method for testing the significance of indirect effects.

Classification of mediation or non-mediation is identified based on whether direct effect is significant or not. The p-values for indirect effects were obtained from the bootstrap result using bias corrected confidence intervals in Amos. Next, to determine the type of mediations or non-mediation according to the criteria listed below (Zhao et al, 2010).

Complementary mediation occurs if both indirect effect and direct effects are significant and have the same directions. The second is competitive mediation occurs if indirect effect and direct effects are both significant and have opposite directions. The third type is indirect-only mediation occurs if indirect effect is significant, but not direct effect. Direct-only non-mediation occurs if direct effect is significant, but not indirect effect and no effect non-mediation occurs if both direct and indirect effects are insignificant**.**

Complementary mediation is known as partial mediation in Baron and Kenny's approach. While the indirect-only mediation is the same as full mediation. However, competitive mediation, direct-only non-mediation and no effect non-mediation fall under no- mediation category in Baron and Kenny's approach which may cause projects to be discarded (Zhao et al, 2010).

There are several implications for the type of mediation or non-mediation established. First, when the first three cases; complementary, competitive and indirect-only mediation occur, the data supports the hypotheses for mediation. Second, in both complementary and competitive mediation, the mediator identified is consistent with the hypothesized theoretical framework, and the significant direct effect signals that there is second possibly omitted mediator which can be examined in any future study. The sign of the direct effect signals for the sign of an omitted indirect path. Third, indirect-only mediation implies that the mediator identified is consistent with hypothesized theoretical framework and there is no need to test for further indirect effects. The sign of the direct effect in direct only non-mediation implies that there is yet undiscovered mediators. Finally, the no effect non-mediation is a failure for testing mediation (Zhao et al, 2010).

4.2.15 Hypothesis Testing

Table 18: Statistics of hypothesis testing

H	Exogenous variables	Mediator variable	Endogenous Variables	Path coefficients	P-value	Results	Type of the mediating effects
Direct Effects							
H1	OC OC		PDI PCI	.241(a_1) .455(a_2)	.002 ***	Supported	
H2	HC HC		PDI PCI	-.013 .251	.741 ***	Partially Supported	
H3	SC SC		PDI PCI	.223 -.302	.201 .001	Partially Supported	
H4	CC CC		PDI PCI	.190 .323	.359 .023	Partially Supported	
Indirect Effects							
H5	HC HC	OC OC	PDI PCI	.029(a_1*b_1) .056(a_2*b_1)	.013 .003	Supported	Indirect only Complementary
H6	SC SC	OC OC	PDI PCI	.086(a_1*b_2) .162(a_2*b_2)	.024 .019	Supported	Indirect only Competitive
H7	CC CC	OC OC	PDI PCI	.059(a_1*b_3) .111(a_2*b_3)	.011 .006	Supported	Indirect only Complementary

*** p<.001

4.3 Discussion of the Results

This part of the analysis is presented in to two major parts as the study has two research questions or two specific objectives to be empirically tested. The first part is about the direct effect of intellectual capital on innovations. Under this part there are about four major hypotheses and each having two sub hypotheses which mean that there are a total of eight sub hypothesis. The second part of the discussion is about the indirect effect of intellectual capital on innovations or the meditational power of organizational capital on intellectual capital and innovations. Under this section there are about three major hypotheses and each having two sub hypotheses which mean there are six sub hypotheses in the second part of the discussion.

4.3.1 (Part I): Direct effect of IC on innovations

This part of the discussion answers the research question of "what are the direct effects of intellectual capital on innovations?"

Empirical findings of the structural equation modeling result using Amos version 20 shows that all intellectual capital components i.e. human, social, customer and organizational capital have a statistically significant direct effect on process innovation but only organizational capital has a statistically significant effect on product innovation and the rest three components doesn't have a significant effect on product innovation. These four intellectual capital components explain 82 and 53 percentage of variance of product and process innovations respectively. This implies that the support of top level management, knowledge management and culture of the organization had a positive influence in designing and implementing new products of and process in the commercial banking sector of Ethiopia.

Organizational capital has a statistically significant positive direct effect on process innovations with path coefficient of 0.455 @ p value below 0.001 and it has also has a statistically significant positive effect on product innovations with a path coefficient of 0.241 @ p value of 0.002. As a result hypothesis one (H1) is supported. The result is consistent with Menona, et al., (2002) which states OC has a positive effect on the performance of new product development. Wu et al., (2008) state that there is a positive relationship between OC and innovation and that OC supports the relationship between social capital, entrepreneurial orientation and innovation. Incremental

innovation is associated positively with OC (Subramaniam and Youndt, 2005). Pizarro, et al., (2009) mentioned that entrepreneurial culture had a positive influence on product innovation and that the integration between entrepreneurial culture and HC supports product innovation. By developing effective processes, organizational culture, knowledge management and top management support, banks can create a high level of innovation (Wu et al., 2008). The result of the study is also consistent with the findings of a research conducted in the Egyptian banking sector by Ahmed, (2014) in that OC has a direct positive effect on both product and process innovations.

The second hypothesis is the direct effect of human capital on product and process innovations (H2a; HC on product innovation and H2b; HC on process innovation). Empirical findings of the study shows that human capital has a statistically significant effect on process innovations with a path coefficient of 0.251 @ p value less than 0.001 but it has a negative and statistically insignificant effect on product innovation with a path coefficient of -0.013 @p value of 0.741 which is above 0.05. As a result the second hypothesis is partially supported by the empirical evidence. This implies that employees' skills, competencies and experiences of banking sector of Ethiopia are not being converted in getting new products to be developed rather they support new banking process to be emerged, developed and implemented.

The study partially (human capital on product innovations) supports the findings of Subramaniam and Youndt (2005) the relation between human capital and innovation, a significant negative relation is found between HC and radical innovations; and Mulugeta, (2015) who found out that human capital has a negative direct effect on product innovations and a negative but statistically insignificant effect on process and organizational innovations.

The finding of the study is inconsistent with the results of the study conducted by Nargesi and Veiseh, (2015); Ahmed, (20140; Osman, (2014); Tseng et al, (2013) and Delgado-Verde et al, (2011), Schneider et al (2010).

The result of the study opposed with findings of Ahmed, (2014). On his study on Egyptian banking sector argued that it seems HC has no direct influence on process innovation but has a significant positive effect on product innovation. This result has not reduced HC’s value for

process innovation. This can be explained due to the fact that banks have suffered from shortage in technical skills. Meanwhile, knowledge obtained from education focuses mainly on managerial skills and service skills rather than those of process. Schneider et al (2010) revealed that the value and unique competencies of employees were associated positively with product innovation in the manufacturing sector. Employees, who lacked skills, could act as a barrier to innovation. In a research on the effect of intellectual capital on organizational innovations among 32 employees for Iraq car manufacturing and textile industries Ahmad (2012), figured out that HC has positive and meaningful effect on innovations.

Ethiopian banking sector managers should lounge probe or deep investigation as to why employees' human capital is negatively related with product innovation while HC is expected to positively go through product innovation.

Social capital has a statistically significant negative direct effect on process innovation with a path coefficient of -0.302 @ p value of 0.001 but positive but statistically insignificant effect on product innovation with a path coefficient of 0.223 @p value of 0.201. As a result hypothesis H3 is not empirically supported. The findings the study opposed with most of literatures such as Subramaniam and Youndt (2005), Ahmed, (2014.

Ahmed argued that there is a significant path from SC to product innovation and the relationship was weak. Additionally there is an insignificant path between SC and process innovation. It partially supports the findings of Mulugeta (2015) who found that SC doesn't have statistically significant relationship with product and process innovations. A study conducted by Prihadyantiet et al, (2012) who examined the role of social capital in facilitating absorptive capacity and innovation capability in Indonesia’s automotive industry. They showed that firms were able to enhance innovation capability through increasing their social capital. Firms involved in learning activities such as discussions and meetings among internal departments or with external parties were able to drive greater knowledge transfer in formal and informal ways.

The present study empirically revealed that the effect of SC on process innovation in Ethiopian commercial banks sector is statistically significant and negative. But when it comes to product innovations, it doesn't have a significant effect. The possible reasons for the lack of influence of

SC on product and process innovations in Ethiopian commercial banking sector could be the following. First, the above researches were conducted in manufacturing sector where as the current study is conducted in service sector so it might be the industry type that hinders SC to directly influence product and process innovations. The second possible reason might be; thoughEthiopian commercial banks have a strong SC, it doesn't necessarily mean that it is an input for innovation. The formal as well as informal communications among employees (the degree of cohesiveness among employees)might be for the sake of employees themselves not for banks.

Customer capital has a statistically significant effect on process innovation with path coefficient of 0.323 @ p value of 0.023 and positive but statistically insignificant effect on product innovation with a path coefficient of 0.190 @ p value of 0.359. As a result, hypothesis four (H4) is partially supported.

Banks ought to accept that customers' knowledge plays an important role in supporting productand process innovation. Increasingly, many service businesses are self-service. For example, by using ATMs, banks modified their tellers handling transactions into ones of self-service technologies. Customers can contribute to the production of the service (Sampson and Spring, 2012). This connection between customers and the processes of service provides knowledge which reinforces the process of innovation.

Based on the empirically found evidence of the study, Intellectual Capital components don't seem to have a positive effect on product innovation of the Ethiopian banking sector with the exception of organizational capital.

4.3.2 (Part II): Indirect effect of IC on Innovations

This part of the discussion is about to empirically test the mediating role of organizational capital between intellectual capital and innovations. There are about a total three major hypotheses and each having two sub hypotheses. These are H5, H6 and H7 about the indirect effect of human, social and customer capital on product and process innovations via organizational capital. All intellectual capital components have a positive indirect effect both on product and process innovations. As a result, the above three hypotheses are supported empirically.

H5: Human capital has a positive indirect effect on product and process innovations via organizational capital. Human capital has a positive effect on product and process innovations with a path coefficient of 0.029 @ p value of 0.013 and 0.056 @ p value of 0.003 respectively. Hence, H5 is supported. Human capital has an indirect only effect on product innovations. Since human capital has a positive direct and indirect effect on process innovation, it has a complementary or partial mediation between human capital and process innovations.

In this sense, through its positive effect on OC, HC contributes indirectly to the improvement of product innovation. This clearly suggests that banks ought to create an appropriate organizational infrastructure to enhance their employees' capabilities and to encourage creativity and innovation. HC was the main source of new ideas which evolved into innovation. Employees' individual skill-sets, training and education are a driving force for boosting innovation and these characteristics become innovative tools if they are extended to the organizational level (Ahmed, 2014).

H6: Organizational capital mediates the relationship between social capital and innovations. Empirical findings of the study reveal that social capital affects product innovation with a path coefficient of 0.086 @ p value of 0.024 and 0.162 @ p value of 0.019 respectively. Social capital has an indirect only effect on product innovation. Organizational capital is a competitive mediator between social capital and process innovations since social capital has a significant direct and indirect effect on process innovations but with different sign (positive indirect and negative direct effect).

Based on the above results, it can be concluded that SC plays both a direct and indirect role in supporting process innovation, whilst through OC it can only indirectly affect product innovation. This finding has not reduced the importance of SC in product innovation, but only changes the nature of this influence. In this sense, due to its positive effect on OC, it can be said that SC indirectly contributes to the improvement of product innovation. Collaborative effort amongst employees improves innovations; and SC especially supports process innovation when employees share goals, responsibilities and complex knowledge. Additionally, OC creates a context which contributes to enhanced cooperation; knowledge sharing; and exchanging tacit experience and team practice in the bank. These areas reflect the two types of innovations

positively. Therefore, the results indicate that in these circumstances, SC reinforces process innovation. Banks which operate in highly coordinated and interactive environments should encourage information sharing and facilitate a climate of innovation (Wu et al., 2008).

H7: Organizational capital mediates the relationship between customer capital and innovations. Customer capital has a positive indirect effect on product and process innovations with a path coefficient of 0.059 @ p value of 0.011 and 0.111 @ p value of 0.006 respectively. Organizational capital is a complementary or partial mediator between customer capital and a process innovation as customer capital affects process innovation both directly and indirectly with the same direction. Customer capital has an indirect only effect on product innovations.

Chapter Five: Conclusion and Recommendations

This chapter of the study presents conclusions, recommendations and direction for future researchers based on the empirical results of the study.

5.1 Conclusion

Based on the empirical findings of the study the following conclusions are made.

- Intellectual capital components do not have a significant direct effect on product innovation with the exception of organizational capital.
- Organizational capital mediates the relationship between intellectual capital and innovations.
- Human, organizational and customer capital have a positive direct effect on process innovation while social capital has a negative direct effect.
- Human, customer and social capital do not have a significant direct effect on Ethiopian banking sector's product innovation.

5.2 Recommendations

The following recommendations are forwarded based on the empirical finding of the study.

- Since organizational capital mediates intellectual capital and innovations, bank managers should carefully set up a mechanism to utilize the skills, competencies, and experiences of their employees through well designed learning, organizational culture and supportive organizational structure.
- Bank managers should allow employees to interact and let employees share thoughts, ideas, develop a habit of cooperation; allow informal communication and trust to develop. Nonetheless, they should assess the rationale of employees' cohesiveness and informal communications.
- Top level management should be concerned of the involvement of customers and employees in new product development process.

5.3 Contribution and Direction for future Research

The very contribution of the study is to check the model in the Ethiopian commercial banking sector using organizational capital as a mediator. Future researchers are highly recommended to check the model in other sectors if possible by taking longitudinal data.

References

- Abu, B. and Ahmad, H. (2010). Assessing the relationship between firm resources and product innovation performance: A resource-based view, *Business Process Management Journal*, 16, 420-435.
- Acur, N., Kandemir, D., De W. and Song, M. (2010). Exploring the impact of technological competence development on speed and NPD program performance, *Journal of Product Innovation Management*, 27, 915-929.
- Adams, R. (2003). Perceptions of innovations: Exploring and developing innovation classification, Doctorate thesis, Cranfield University, UK.
- Ahmed, A. (2014). An investigation of the effects of intellectual capital on innovations in the Egyptian Banks: The mediating role of organizational capital. Doctorate thesis, Plymouth University.
- Ahmed, D. (2012). Influence of Intellectual Capital in the Organizational Innovation. International Journal of Innovation, Management and Technology 3(2): 128-135
- Amabile, T. (1983). *The Social Psychology of Creativity*, New York, Springer.
- Antonio, M., Jovita, V., and Vilmante, K. (2012). Role of knowledge management within innovation and performance: Journal of economic and management: 2012. 17 (1).ISSN 2029-9338 (ONLINE).
- Atalay, M. and Anafarta, N. (2011). Enhancing innovation through intellectual capital: A theoretical overview. *Journal of Modern Accounting and Auditing,* 7, 202-210.
- Baba, Y. and Walsh, J. (2010). Embeddedness, social epistemology and breakthrough innovation: The case of the development of statins. Research Policy, 39, 511- 522.
- Barney, J. (2002). *Gaining and sustaining competitive advantage.* New Jersey: Prentice Hall.
- Betz, B. (2011). *Managing Technological Innovation: Competitive Advantage from Change*, New Jersey, John Wiley & Sons, Inc.
- Bohlmann, J., SpanjoL, J., Qualls, W. and Rosa, J. (2012). The interplay of customer and product innovation dynamics: an exploratory study: *Journal of Product Innovation Management,* 30, 228-244.

- Bontis, N. (1998). Intellectual capital: An exploratory study that develops measures and models: *Management Decision,* 36. 63-76.
- Bontis, N. (2001). Assessing knowledge assets: A review of the models used to measure intellectual capital. *International Journal of Management Reviews*, 3, 41-60.
- Bontis, N., Crossan, M. and Hulland, J., (2002). Managing an organizational learning system by aligning stocks and flows: Journal of Management Studies, 39, 4.
- Boris L., Anita van Gils and Eva B. (2009).Crafting Firm Competencies to Improve Innovative Performance:
- Carbonell, P., Rodríguez-Escudero, A. andPujari, D. (2009). Customer involvement in new service development: An examination of antecedents and outcomes. *Journal of Product Innovation Management*, 26, 536-550.
- Chen, Y., Lin, M. and Chang, C. 2006. The influence of intellectual capital on new product development performance - The manufacturing companies of Taiwan as an example. *Total Quality Management*, 17, 1323–1339.
- Cooper, R. (2011), Perspective: The innovation dilemma. How to innovate when the market is mature: *Journal of Product Innovation Management*, 28, 2-27.
- Creswell, J. (2003). Research design: Qualitative, Quantitative and Mixed methods approaches, 2nd ed., Sage Publications, California.
- Crook, T., Todd, S., Combs, J., Woehr, D. and Ketchen J. (2011): Does human capital matter? A meta-analysis of the relationship between human capital and firm performance: *Journal of Applied Psychology*, 96, 443-456.
- Damanpour, F. (1987). The adoption of technological, administrative, and ancillary innovations: impact of organizational factors. *Journal of Management,* 13, 675-689.
- Damanpour, F. and Evan, W. (1984). Organizational innovation and performance: the problem of organizational lag. *Administrative science quarterly*, 29, 392-409.
- Delgado M. (2011). The Role of Intellectual Capital Assets on the Radicalness of Innovation: Direct and Moderating effects. UAM-Accenture Working Papers ISSN: 2172-8143
- Droege, H., Hildebrand, D. and Forcada, M. (2009). Innovation in services: present findings, and future pathways. *Journal of Service Management*, 20, 131-155.

- Edvinsson, L. and Malone, M. (1997). Intellectual capital–realizing your company's true value by finding its hidden roots, Harper Business, New York.
- Feiwal, G. (1975).*The* Intellectual Capital of Michal Kalecki: A Study in Economic Theory and Policy*,* The University of Tennessee Press, Knoxville, TN.
- Foss, N., Laursen, K. and Pedersen, T. (2011). Linking customer interaction and innovation: the mediating role of new organizational practices. *Organization Science*, 22, 980-999.
- Gopalakrishnan, S. and Damanpour, F. (2000). The impact of organizational context on innovation adoption in commercial banks. *IEEE Transactions on Engineering Management*, 47, 14-25.
- Hair, J., Black, W., Babin, B. and Anderson, R. (2010). *Multivariate data analysis*, 7th edition, New York: Prentice Hall.
- Hsu, Y. and Fang, W. (2009). Intellectual capital and new product development performance: the mediating role of organizational learning capability. *Technological Forecasting & Social Change*, 76, 664-677.
- Huang, H. (2008). *Research on the intellectual capital value drivers*. China: Doctoral Dissertation, Department of Accounting, Jinan University, China.
- Huang, H., Lai, M. and Lin, T. (2011). Aligning intangible assets to innovation in biopharmaceutical industry. *Expert Systems with Applications*, 38, 3827-3834.
- Jacobs R. Mannion R., Davies H., Harrison S., Konteh F. andWalshe K. (2013). The relationship between organizational culture and performance in acute hospitals. *SocSci Med,*76, 115-25.
- Jaskyte, K. (2011). Predictors of administrative and technological innovations in non-profit organizations. *Public Administration Review*, 71, 77-86.
- John, K.(2013). Influence of intellectual capital on the growth of small and medium enterprises in Kenya: International Journal of Arts and entrepreneurship Special Issue, 2013.
- Khedr, A. (2008). Adoption of new technologies in a highly uncertain environment: the case of knowledge discovery in databases for customer relationship management in Egyptian public banks.

- Kim, D., Kumar, V. and Kumar, U. (2012). The relationship between Quality Management Practices and Innovation. *Journal of Operations Management*. 30, 295-315.
- Kim, J. and Mueller, C. (1978). *Introduction to Factor Analysis: What it is and How to Do it*. Beverly Hills, CA: Sage.
- Kothari, C. (2004). Research Methodology: Methods and Techniques, Second edition, New Delhi, New Age Intraltional (P) Ltd
- Lavie, D and Drori, I. (2012). Collaborating for knowledge creation and application: the case of nanotechnology research centers. *Organization Science*, 23, 704-724.
- Madrid-Guijarro, A., Garcia, D. and Van Auken, H. (2009). Barriers to innovation among Spanish manufacturing SME. *Journal of Small Business Management*, 47, 465-488.
- Mahmood, R. and Abd Wahid, R. (2012). Applying corporate entrepreneurship to bank performance in Malaysia, Journal of Global Entrepreneurship, 3(1), 68-82.
- Martínez, A., Belso-martínez, J. and Más-verdú, F. (2012). Industrial clusters in Mexico and Spain: Comparing inter-organizational structures within context of change, *Journal of Organizational Change Management*, 25, 657-681.
- Masoud, P., Niusha, M., Mostafa, H., and Leila, A., (2014). Studying the effect of intellectual capital on organizational performance: *International Journal of Economy, Management and Social Sciences.*
- Masoud, P., Niusha, M., Mostafa, H., and Leila, A., (2014). Studying the effect of intellectual capital on organizational performance: *International Journal of Economy, Management and Social Sciences.*
- Masoulas, V. (1998). Organizational requirements definition for intellectual capital management. *Technology Management*, 16(1/2/3), 126-143.
- Mohammad, R. and, Hassan, V. (2013). The study of intellectual properties effect on organizational innovation on Science and Technology Park in Semnan: Journal of Social Issues & Humanities, Volume 1, Issue 5, October 2013 ISSN 2345-2633.
- Molina, M., and Martinez, M. (2010). Social networks: effects of social capital on firm innovation. Journal of Small Business Management, 48, 258-279.
- Mulugeta E. (2015), Effects of intellectual capital on innovations in the Ethiopian Banking Sector: the mediating role of knowledge management capital.

- Oddane, T. (2008). Organizational conditions for innovation: a multi-perspective approach to innovation in a large industrial company, Doctorate thesis, Norwegian University of Science and Technology.
- Olczyk, M. (2011). Demand for Innovation Support in Small and Medium Enterprises in the Baltic Sea Region.
- Perks, H., Gruber, T. and Edvardsson, B. (2012). Co-creation in radical service innovation: A systematic analysis of micro level processes. *Journal of Product Innovation Management*, 29, 1-17.
- Pizarro et al(2009). The role of entrepreneurial culture and human capital in innovation, Working paper series, Department of Business Administration, Universidad Pablo de Olavide .
- Pollack, J.B., Costello, K. and Sankaran, S. 2013. Applying actor-network theory as a sense making framework for complex organizational change programs, *International Journal of Project Management*, 31, 118-1128.
- Prihadyanti, D., Surjandari, I.andDianawati, F. (2012), 'Harnesing the Potential of Social Capital for Increasing Innovation Capability: Benefit for Maintaining Supplier-Customer Relationship', *International Journal of Engineering Science and Technology*, vol. 4, no. 4, pp. 1750-1759.
- Putnam, R., (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 64-78.
- Ramanauskaitė, A. (2012). Intellectual Capital Valuation: Methods and Their Classification
- Rehman, W., Rehman, H., Usman, M. (2012). A Link of intellectual capital performance with corporate performance: comparative study from banking sector in Pakistan, international *Journal of Business and Social Science*, 3, 313-322.
- Ritala, P., and Hurmelinna-laukkanen, P. (2013), Incremental and radical innovation in coopetition-the role of absorptive capacity and appropriability. *Journal of Product Innovation Management*, 30, 154-169.
- Rogers, E. (1995). *Diffusion of Innovations*. New York, Free Press.

- Rosni, A., and Rosli, M. (2013).Relationship of Intellectual Capital Dimensions and Performance of Banks inMalaysia: An Exploratory Study: International Journal of Business and Social Science Vol. 4 No. 15.
- Santos, R., Figueroa, P. and Jardon, C. (2011). The main intellectual capital components that are relevant to the product, process and management firm innovativeness. *International journal of transitions and innovation systems*, 1, 271-301.
- Saunders, M., Lewis, P. and Thornhill, A. (2012). *Research Methods for Business Students*. 6th ed. England, Pearson.
- Saunders, M., Thornhill, A. and Lewis, P. (2009). *Research Methods for Business Students*. England, Pearson education Limited.
- Schneider, L., Gunther, J. and Brandenburg, B. (2010). Innovation and skills from a sectoral perspective: a linked employer-employee analysis. Economics of Innovation & New Technology 19, 185–202.
- Sekaran, U. (2003). *Research Methods for Business: A Skill-Building Approach*. John Wiley& Sons, Inc.
- Stewart, T. (1997). *Intellectual capital: The new wealth of organization. New York.* Doubleday Dell Publishing Group, USA.
- Subramaniam M. and Youndt M. (2005). The influence of intellectual capital on the types of innovative capabilities. Academy of Management Journal 2005, Vol. 48, No. 3, 450–463.
- Syed, K., Kamariah, I., Wafa, K., and Khairiah, B., (2014). Impact of social capital and firm's innovative capability on sustainable growth of woman owned technologies (SMEs): A study in Malaysia: World applied sciences journal 29 (10): 1282-1290, 2014.
- Tseng, J., Wang, H.and Yen, Y. (2013), 'Organizational Innovability: Exploring the Impact of Human and Social Capital in the Banking Industry', *Total Quality Management & Business Excellence*, DOI 10.1080/14783363.2013.781294.
- Tushman, L. and Nadler, D. (1986). Organizing for innovation. *California Management Review, 28*, 74-92.
- Un, C., Cuervo-cazurra, A. and Asakawa, K. (2010). R&D collaborations and product Innovation. *Journal of Product Innovation Management,* 27, 673-689.

- Wu, W., Chang, M. and Chen, C. (2008): Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation. *R&D Management* 38, 265-277.
- Xiaobo, W. and Sivalogathasan V., (2013), Innovation Capability for better Performance: Intellectual Capital and Organization Performance of the Apparel Industry in Sri Lanka: *Journal of Advanced Management Science Vol. 1, No. 3, September 2013*
- Yamaguchi, I. (2013). A Japan–US cross-cultural study of relationships among team autonomy, organizational social capital, job satisfaction, and organizational commitment. *International Journal of Intercultural Relations,* 37, 58-71.
- Yamane, T. (1967), statistics: An Introduction Analysis, 2nd ed., New York: Harper and Row.
- Yang, C., and Lin, C. (2009). Does intellectual capital mediate the relationship between HRM and organizational performance? Perspective of a healthcare industry in Taiwan. *The International Journal of HRM*, 20, 1965-1984.
- Young, D., Borland, R. and Coghill, K. (2010). An actor-network theory analysis of policy innovation for smoke-free places: understanding change in complex systems. *American Journal of Public Health*, 100, 1208-1217.

Appendix A: Questionnaire

College of Business & Economics

Master of Business Administration Program

Dear Sir/Madam,

My name is **AsheberDemissie**, Final year Masters of Business Administration (MBA) student at Department of Management, Faculty of Business and Economics –Addis Ababa University. I am conducting a study on**"Relationship between Intellectual Capital and Innovations: The Mediating Role of Organizational Capital"**

I understand that your time is valuable, but I would appreciate if you would spend some minutes to complete this questionnaire. Your completion of the questionnaire is critical to the success of the study. Let me emphasize that your participation in this study is voluntary and all information you provide will be kept strictly confidential. Thank you for your timely completion and return of the questionnaire.

Kind regards,

AsheberDemissie
Cell phone: 0911611087

Part I Personal and job information

Please tick where appropriate.

1. Gender: Male ☐ Female ☐
2. My bank is: Public bank ☐ Private sector bank ☐
3. What is the highest level of education that you have completed?
   Bachelor Degree ☐ Advanced studies after Bachelor Degree ☐

Part II Intellectual Capital

Please use the following scale to describe the intellectual capital in your bank: 5= Strongly Agree (SA), 4= Agree (A), 3= Neutral (N), 2= Disagree (D) and 1= Strongly Disagree (SD).

	Human Capital	SA	A	N	D	SD
1	Our bank acquires employees with suitable knowledge and competencies					
2	Our bank retains the most talented employees who have a suitable educational level.					
3	Employees can work brightly.					
4	Employees have skills for creation innovations.					
5	Our employees are experts in their particular jobs and functions.					
6	Our bank increases the competence of employees by providing training opportunities					
7	Our bank encourages employees to acquire additional academic qualifications					
8	Our employees have the required experience to perform their respective job.					
9	Our bank has academically qualified employees					

	Social Capital	SA	A	N	D	SD
1	Employees often exchange information informally.					
2	Our bank is characterized by personal friendship among the colleagues at multiple levels.					
3	Employee avoids making demands that can seriously damage the interests of the other.					
4	Our colleagues clearly understand the goals / values in our bank.					
5	People in our department are enthusiastic about pursuing the collective					

	goals of the whole bank.					
6	Our employees are skilled at collaborating with each other to diagnose and solve problems.					
7	Our employees interact and exchange ideas with people from different areas of the bank.					
8	Our bank obtains a lot of information from employees through their social networks					
9	Our bank has established linkages with other firms					
10	Our bank shares a lot of information with other banks within the banking industry.					
11	Our employees mutually trust each other.					
Customer Capital		SA	A	N	D	SD
1	Our customers would indicate that they are generally satisfied with our bank.					
2	Our bank tries to offer the best service to customers in the banking industry					
3	Our bank considers customers' needs and wants.					
4	We are confident of our future with customers					
5	Our bank obtains frequent feedback from customers about the quality of services provided					
6	There are established mechanisms through which customers can channel their complaints					
7	Customer satisfaction surveys are carried out frequently					
8	Customer claims are processed within a reasonable period of time					

Organizational Capital		SA	A	N	D	SD
1	Our bank culture is supportive and comfortable to innovation					
2	Our bank has an effective management process					
3	Our bank has an effective knowledge management system					
4	Our top management team regards employees as the source of innovation					

Part III Innovations Implemented

Please use the following scale to describe the innovation in your bank: 5= Strongly Agree (SA), 4= Agree (A), 3= Neutral (N), 2= Disagree (D) and 1= Strongly Disagree (SD).

	Product Innovation	SA	A	N	D	SD
1	Our bank is able to replace obsolete service.					
2	Our bank develops its services speedily.					
3	Our bank innovate many services like packaged accounts/ services for target market.					
4	Our services are innovatively designed					
	Process Innovations	SA	A	N	D	SD
1	Our bank is able to manage a portfolio of technological methods.					
2	Our bank is able to absorb the basic technologies of business.					
3	Our bank has valuable knowledge for technological process- innovation.					
4	Our bank continually develops programs to reduce service costs					
5	Our bank organizes its service processes efficiently.					
6	Our bank assigns resources to the service processes efficiently.					
7	Our bank is able to maintain a low level service process without impairing the service.					

Appendix B: Descriptive Statistics

```
FILE='C:\Users\a\Desktop\Ashebir\final data '.
DATASET NAME DataSet1 WINDOW=FRONT.
DESCRIPTIVES VARIABLES=HC1 HC2 HC3 HC4 HC5 HC6 HC7 SC1 SC2 SC3 SC4 SC5 SC6
SC7 SC8 CC1 CC2 CC3 CC4 CC5 CC6 OC1 OC2 OC3 OC4 PDI1 PDI2 PDI3 PDI4 PCI1 PCI2
PCI3 PCI4 PCI5 PCI6 OI1 OI2 OI3 OI4 OI5 OI6 OI7 OI8
  /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
HC1	235	1	5	4.11	.699	-.754	.159	1.637	.316
HC2	235	1	5	3.84	.728	-.548	.159	.823	.316
HC3	235	1	5	3.42	.923	-.507	.159	-.010	.316
HC4	235	1	5	3.90	.808	-.751	.159	.935	.316
HC5	235	1	5	4.14	.828	-1.225	.159	2.193	.316
HC6	235	1	5	3.97	.768	-1.043	.159	2.347	.316
HC7	235	1	5	4.21	.706	-1.054	.159	2.875	.316
SC1	235	1	5	3.70	.985	-.752	.159	.248	.316
SC2	235	1	5	3.93	.781	-.639	.159	.638	.316
SC3	235	1	5	3.77	.916	-.766	.159	.732	.316
SC4	235	2	5	4.00	.701	-.520	.159	.561	.316
SC5	235	1	5	3.76	.813	-.692	.159	.658	.316
SC6	235	1	5	3.31	.991	-.275	.159	-.185	.316
SC7	235	1	5	3.60	.966	-.530	.159	.076	.316
SC8	235	1	5	3.98	.867	-.721	.159	.407	.316
CC1	235	1	5	3.78	.859	-.783	.159	.697	.316
CC2	235	2	5	4.20	.756	-.950	.159	1.085	.316
CC3	235	1	5	4.03	.886	-.867	.159	.581	.316
CC4	235	1	5	4.01	.837	-.677	.159	.274	.316
CC5	235	1	5	3.89	.878	-.746	.159	.422	.316
CC6	235	1	5	3.79	.926	-.809	.159	.449	.316
OC1	235	1	5	3.85	.888	-.803	.159	.770	.316
OC2	235	1	5	3.85	.843	-.823	.159	1.380	.316
OC3	235	1	6	3.67	.991	-.606	.159	-.052	.316
OC4	235	1	5	3.52	1.018	-.371	.159	-.295	.316
PDI1	235	1	5	3.84	.932	-.736	.159	.216	.316
PDI2	235	1	5	3.80	.936	-.672	.159	.083	.316

PDI3	235	1	5	3.70	.955	-.638	.159	.100	.316
PDI4	235	1	5	3.57	.982	-.401	.159	-.217	.316
PCI1	235	1	5	3.75	.821	-.590	.159	.464	.316
PCI2	235	1	5	3.76	.849	-.706	.159	.440	.316
PCI3	235	1	5	3.61	.942	-.577	.159	.016	.316
PCI4	235	1	5	3.69	.848	-.502	.159	-.064	.316
PCI5	235	1	5	3.63	.899	-.613	.159	.183	.316
PCI6	235	1	5	3.44	.773	-.268	.159	.415	.316
OI1	235	1	5	3.41	1.031	-.518	.159	-.137	.316
OI2	235	1	5	3.56	.872	-.451	.159	-.014	.316
OI3	235	1	5	3.41	1.076	-.374	.159	-.470	.316
OI4	235	1	5	3.19	1.117	-.097	.159	-.913	.316
OI5	235	1	5	3.39	.960	-.435	.159	-.203	.316
OI6	235	1	5	3.55	.911	-.673	.159	.278	.316
OI7	235	1	5	3.31	1.029	-.311	.159	-.287	.316
OI8	235	1	5	3.39	1.094	-.392	.159	-.395	.316
Valid N (listwise)	235								

Linearity Test

Model Summary and Parameter Estimates

Dependent Variable: OC

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.226	68.026	1	233	.000	1.097	.666		
Logarithmic	.205	60.173	1	233	.000	.727	2.199		
Inverse	.153	42.138	1	233	.000	5.133	-5.435		
Quadratic	.232	35.016	2	232	.000	2.477	-.087	.100	
Cubic	.239	24.229	3	231	.000	-.265	2.797	-.820	.092
Compound	.180	51.254	1	233	.000	1.718	1.209		
Power	.169	47.440	1	233	.000	1.524	.638		
S	.133	35.863	1	233	.000	1.711	-1.620		
Growth	.180	51.254	1	233	.000	.541	.190		
Exponential	.180	51.254	1	233	.000	1.718	.190		
Logistic	.180	51.254	1	233	.000	.582	.827		

The independent variable is HC.

Model Summary and Parameter Estimates

Dependent Variable: OC

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.299	99.425	1	233	.000	.925	.744		
Logarithmic	.295	97.392	1	233	.000	.264	2.634		
Inverse	.283	92.084	1	233	.000	6.123	-8.817		
Quadratic	.299	49.573	2	232	.000	1.343	.512	.032	
Cubic	.300	49.635	2	232	.000	1.321	.579	.000	.004
Compound	.257	80.537	1	233	.000	1.588	1.247		
Power	.260	81.771	1	233	.000	1.288	.790		
S	.257	80.531	1	233	.000	2.021	-2.682		
Growth	.257	80.537	1	233	.000	.462	.220		
Exponential	.257	80.537	1	233	.000	1.588	.220		
Logistic	.257	80.537	1	233	.000	.630	.802		

The independent variable is SC.

Model Summary and Parameter Estimates

Dependent Variable: OC

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.289	94.810	1	233	.000	1.314	.609		
Logarithmic	.266	84.404	1	233	.000	.881	2.091		
Inverse	.231	70.153	1	233	.000	5.421	-6.494		
Quadratic	.307	51.336	2	232	.000	3.549	-.623	.164	
Cubic	.308	51.607	2	232	.000	2.907	.000	-.025	.018
Compound	.224	67.154	1	233	.000	1.847	1.187		
Power	.209	61.674	1	233	.000	1.624	.593		
S	.186	53.396	1	233	.000	1.777	-1.862		
Growth	.224	67.154	1	233	.000	.614	.171		
Exponential	.224	67.154	1	233	.000	1.847	.171		
Logistic	.224	67.154	1	233	.000	.541	.843		

The independent variable is CC.