

**ELECTRONIC COMMERCE CAPABILITY AND PERFORMANCE OF
COMMERCIAL BANKS IN KENYA**

BY

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DECLARATION

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DEDICATION

This thesis is dedicated to my parents Richard Kusoma and Rose Mutuku for their love, sacrifice and support throughout my academic life, my brothers and sisters Morgan Kusoma, Kennedy Ndaya, Mary Ngina and Gladys Kusoma for their encouragement and prayers. Finally, deepest gratitude to my wife Benadetta Mutinda, my daughters Mia Mueni and Mila Munyiva for their understanding and overwhelming moral support.

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OPERATIONAL DEFINITION OF TERMS

- Back-end integration capability** Ability of a firm to forge a strong electronic integration to facilitate inventory management, coordination and fulfilment between back offices and external users. EDI links, virtual community and data sharing.
- Bank Regulatory Requirements** Form of government regulations which subject banks to certain expectations, restrictions and guidelines.
- Business Operating Environment** Variables outside the firm that influence its business activities.
- Commercial Bank** Financial institution engaged in the business of taking deposits, giving loans and offering elementary investment products.
- Competitive Advantage:** A strategic advantage one firm has over other firms within the same industry through implementation of a value creating strategy not simultaneously being implemented by the current firms thus enabling the firm to outperform the competition.

Customer Satisfaction	The measure of how services and products provided by a firm meet customer's expectations. This is measured by customers' satisfaction survey index.
Customization capability	Ability to improve customers' interactions through personalization of products or services. Customization comprises online registration, online product recommendation, account management and real-time support.
Electronic Commerce	A form of business that allows a firm or individual to do business over electronic systems, regularly the web the web. It encompasses B2B, B2C and C2C e-commerce.
Electronic Commerce Capability	Firms' ability to provide information, facilitate transactions, offer customized services, and integrate the back end.
Performance	Firm's ability to make profits on its assets and provide returns to its investors as measured by Return on Assets (ROA) and Return on Equity (ROE).

Information capability

Firm's ability to offer sufficient amount of information about products, services, and itself to customers. The capability of e-commerce information comprises products information, search capability and provide product reviews.

Transaction capability

Ability to conduct online transactions. Transaction e-commerce capability comprises buying, online payment and provision of web security

ABBREVIATIONS AND ACRONYMS

B2B	Business-to-Business
B2C	Business to Consumer
CA	Competitive Advantage
C2B	Consumer to Business
C2C	Consumer to Consumer
CBK	Central Bank of Kenya
CBRC	China Banking Regulatory Commission
CLRM	Classical Linear Regression Model
DCT	Dynamic Capability Theory
EC	Electronic Commerce Capability
EFTPoS	Electronic Funds Transfer at Point of Sale
EPS	Earnings Per Share
GoK	Government of Kenya
HHI	Herfindahl-Hirschman Index
ICT	Information and Communication Technology
IMF	International Monetary Fund

IT	Information Technology
ITIL	Information Technology Infrastructure Library
KEPSS	Kenya Electronic Payment and Settlement System
NACOSTI	National Commission for Science, Technology and Innovation
OLS	Ordinary Least Squares
PC	Personal Computer
PoS	Point of Sale
RBV	Resource Based View
ROA	Return on Asset
ROE	Return on Equity
ROI	Return on Investment
ROIC	Return on Invested Capital
RTGS	Real Time Gross and Settlement
TOE	Technology-Organization-Environment
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences
VIF	Variance Inflation Factors

UTAUT

Unified Theory of Technology Acceptance and Use of Technology

WTO

World Trade Organization

ABSTRACT

Kenya's Vision 2030 economic blueprint seeks to transform Kenya into a middle-income country by the year 2030. The Government of Kenya through the Central Bank of Kenya has provided an enabling environment to ensure that commercial banks contribute towards the realization of the Vision 2030's envisaged prosperous economy. In order to play their intermediation role, commercial banks have to be profitable. They have thus invested heavily in e-commerce solutions. Despite these initiatives, commercial banks have presented mixed results in terms of their performance. Hence, this study investigated the effect of e-commerce capability on performance of commercial banks in Kenya. The specific objectives of the study were to establish the effect of e-commerce information capability, transaction capability, customization capability and back-end integration capability on performance of commercial banks in Kenya. The study also sought to establish the moderation effect of the business operating environment on the relationship between e-commerce capability and performance of commercial banks and determine the mediation effect of competitive advantage on the relationship between e-commerce capability and performance of commercial. The study was anchored on Unified Theory of Technology Acceptance and Use of Technology Theory and supported by Dynamic Capability Theory and Resource-Based View Theory. The study was guided by positivism research philosophy and used explanatory non-experimental design. A census of 43 commercial banks was taken; data for performance was extracted for the financial year 2016/2017. Data for e-commerce capability was collected from commercial banks websites. Data analysis was done using descriptive and inferential statistics. The study established that e-commerce information capability, customization capability and back-end capability significantly affected performance of commercial banks in Kenya. Transaction capability had an insignificant effect of performance of commercial banks in Kenya. The study further established that the business operating environment had positive but insignificant moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya. Competitive advantage was found to partially mediate the relationship between competitive advantage and performance of commercial banks in Kenya. The study concluded that information capability, customization capability and back-end integration capability were significant predictors of performance of commercial banks. The study recommends that management of banks should invest more resources in e-commerce capability to improve their performance. The study further recommended for banks should include more transaction capability in their e-commerce platforms. This will ensure reduction in operation costs especially marketing and transactions costs.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Every market economy requires the existing banking system ready to guarantee mobilization of funds, directing such funds towards the quest for efficient financial activities (San & Heng, 2013). Commercial banks play a crucial role of financial intermediation between depositors and borrowers, prompting a more productive allocation of resources and faster economic growth in a nation's economy (Driga, 2006; Ongore, 2013).

According to Otuori (2013), commercial banks play the intermediation role if they are profitable. Their profitability is important since the financial health of an industry is closely associated with the soundness of the whole economy (Lipunga, 2014). Besides that basic role, the performance of banks influences the economic development of nations.

Good performance of banks rewards shareholders for their investments, besides promoting national development and economic growth (Kenya & Gitonga, 2016). Therefore, bank performance review remains a subject of concern to researchers ever since the economic downturn in the 1940s (Ongore & Kusa, 2013). According to the researchers, commercial banks should generate sufficient earnings to cover the operational expenses they incur

during business. Therefore, banks must make profits, for their sustainable and effective intermediation.

Performance of commercial banks has also been a subject of interest by shareholders, investors, financial analysts, bank managers and government agencies. Financial efficiency is one of the key determinants of banks' profitability. Despite more than two decades of financial deepening by commercial banking industry in sub-Saharan Africa, commercial banks have posted mixed results (European Investment Bank, 2015). A report by International Monetary Fund (IMF) indicates that growth in overall performance has been fluctuating in numerous nations in sub-Saharan-Africa; the growth is way below the expectations (IMF, 2016).

Kenya boasts of the most established banking sector within the East Africa community (European Investment Bank, 2013). Its banking system is the fourth biggest in sub-Saharan Africa with South Africa leading, Nigeria and Mauritius closely following. Over the years, commercial banks in Kenya have been characterized by poor performance (CBK, 2016). This has led to the collapse of banks and a wave of mergers of some banks. These include the Continental Bank of Kenya and Chase Bank, among others. This has caused panic to various stakeholders in the financial sector.

Research studies by Bhattarai (2015), Nzoka (2015), Wambari and Mwangi(2017) have tried to expose the internal and external elements that affect profitability as the source of decline in performance. For instance, the Cooperative Bank of Kenya recorded a six per cent drop in 2017 quarter one net profit. The net profit stood at Sh3.2 billion, compared to Sh 3.4 billion in the first quarter of 2016 (CBK, 2017). Sharma and Gadenne (2002) assert that a firm's survival and prosperity is demonstrated by its overall performance over a certain period.

The Unified Theory of Technology Acceptance and Use of Technology (UTAUT) holds that in the banking industry, the consumer behavior is task-oriented; customers are free to select among numerous channels to do transactions such as personal computers, cellphones or direct banking (Lee, Park, Chung & Blakeney, 2012). According Damanpour and Damanpour (2001), firms can enhance their overall performance by using e-commerce capability (EC). This capability incorporates decreased transaction costs, improved data administration, more extensive geographical scope and better coordination amongst providers and firms.

Drawing on the Resource-Based View (RBV) Theory, the manner a firm's assets are coordinated, configured and deployed is instrumental in managing its overall performance (Teece, 2016). The theory aids in appreciating the value of technological innovations in

firms. The theory postulates that firms achieve competitive advantage and improved performance by way of employing precious resources and capability which can be inflexible in delivery (Grunert & Hildebrandt, 2004; Qu, Oh & Pinsonneault, 2010).

Researchers and business executives have attempted to establish the general strategies for developing valuable and competitive business plans. According Grunert and Hildebrandt (2004), the RBV Theory attempts to explore why some firms are more competitive and perform better than others. Additionally, researchers posit that firms perform better by utilizing key resources and capability that are imitable. Das and Teng (2000) identified e-commerce capability and skills as the crucial resources that firms need to successfully compete and improve performance.

A scope of firm capability has been established to represent the success of innovations and the accomplishment of firm performance. However, innovations alone are not capable of sustaining a firm's competitive advantage. Nonetheless, they should be supplemented with infrastructure, top management support and information technology (IT) expertise to accomplish better performance (Zott, 2003).

1.1.1 Firm Performance

Firm performance is the accrued outcome of all firm's operations and activities (Wheelen & Hunger, 2011). Business executives measure firm performance since it prompts improved asset administration, enhanced capacity to offer customer value, improved and better firm knowledge. Carrying out financial measurement is essential for good business administration (Demirbag, Tatoglu, Tekinus & Zaim, 2006). When performance of the firm is analyzed, managerial decisions that informed firms cash generating activities are evaluated. This helps to determine if the valuable resources were utilized efficiently, if the firm was profitable and if financing decisions were made prudently.

Studies have been undertaken to establish measures for the concept of firm performance in order to establish a performance measure for firms. This is with a view to assisting in comparing performances over different times. Dyer and Reeves (1995) suggested four probable forms of measuring performance of firms; firstly, human resource outcomes which encompass satisfaction with job, absenteeism, and turnover. Secondly, company outcomes which embody exceptional, productiveness, and service. Thirdly, financial accounting outcomes which entail return on assets and return equity and fourthly, capital marketplace consequences which include stock prices, boom, and returns.

The choice of performance measures depends upon the firm's objectives (Neely, 1999). Financial performance measurements have been criticized for focusing on historical data and the partial valuation of future events such as depreciation and payback. However, most studies have utilized them because they are objective and they are reflected at the company's monetary statements (Kaplan & Norton 1992).

Nobes and Stadler (2015) argue that excluding non-financial information produces partial representation of performance. Liang and Yao (2005) assert that non-financial measures have no inherent incentive for firms. Rather, they are key indicators that provide information on future performance lacking in contemporaneous financial measures. However, Zhuang and Lederer (2003) used both financial and non-financial measurements such as profitability, return on asset (ROA), sales turnover and employee productivity to measure firm performance.

Damanpour and Damanpour (2001) employed transaction costs, information management, coordination between suppliers and firm to measure the overall performance of the firm. However, Naushad and Malik (2015) suggest ROA, Return on equity (ROE), Tobin Q and return on invested capital (ROIC) as the measures of financial performance. All these are different from one another but provide a clear picture of management's effectiveness and efficiency. These measures are closely related and are widely accepted; they provide a

clear picture of management's effectiveness and efficiency. ROA measures the firm's ability to generate profits from its assets. On its part, ROE measures a firm's profitability and growth potential from the shareholders or investors perspective (Naushad & Malik, 2015).

There has been intense debate as to which profitability ratio best measures a firm's financial performance. However, Zhu (2004), Hoq and Chauhan (2011 and Guerreiro (2015) recommend that EC effect on firm performance should be measured in financial terms. This is because a firm's ability to perform financially is critical to its survival in the short and long run. Similarly, bank financial performance is the best measurement in terms of profitability using ROA and ROE. This study therefore used ROA and ROE to measure commercial banks' financial performance as they consider the capital structure of the firm.

1.1.2 E-commerce Capability

The exponential growth of internet has contributed to the stiff competition in the banking sector. Consequently, commercial banks have relied on e-commerce capability to offer financial services and products to customers. Studies show that while the most of the commercial banks in Kenya have implemented e-commerce solutions, some customers have not accepted e-commerce and this has contributed to the low usage (Ayuma & Munyoki, 2012). However, Magutu, Ongeru and Mwangi (2009) contend that adoption of

e-commerce is inspired by its potential to create firm value and by cognizance of its contribution to the firm's performance.

Nath and Shillong (2013), Kinuthia and Akinnusi (2014) posit that e-commerce entails conducting business operations by means of electronic media, especially the web. The various models of e-commerce are business-to-Business (B2B) e-commerce model; it alludes to the full range of business operations that occur between two firms; by a wide margin, it is the most common model of e-commerce (Kenneth & Guercio, 2017).

According to Laudon (2009), business to-consumers (B2C) e-commerce model includes retailing exchanges amongst business firms and individual customers, for instance, the online retailers such as Amazon. Consumer to-consumer (C2C) e-commerce model entails exchanges between buyers; websites serve to facilitate the exchanges such as eBay. Consumer-to-Business (C2B) e-commerce enables consumers to offer goods and services to businesses, for instance, monster.com.

According to World Trade Organization (WTO), the uprise of information has contributed to the rapid development of e-commerce (WTO, 2013). E-commerce has presented a new method of doing business. Firms are endeavoring to develop innovations to effectively accomplish their goals (Chandran, Kang & Leveaux, 2001). The motivation behind the

adoption of online business by firms is prevalently to expand their client base by investigating new promoting channels, or to rival customary channels. Online business abilities mirror business vital activities to utilize e-commerce exchange data and information, enhance client benefits, and reinforce provider combination.

E-commerce capability dimensions extend from transaction capability, including static data to dynamic informational capability such as service or product information to navigation, customization and back-end integration services (Yu, 2008). According to Vladimirov (2015), ECs are often firmly associated with the firm's assets and engrained in the operational procedures of the business firm. As such, e-commerce passes on to the firm, an asset that cannot be substituted for or on the other hand effectively imitated.

Vladimirov (2015) further argue that the allocation of these resources positively influences firm performance. Zhu and Kraemer (2005) modeled the e-commerce capability in four dimensions: information capability, transaction capability, customization capability and integration capability. They established a strong relationship between the constructs and firm performance. Similar complementarity between e-commerce capability were also found to strongly influence firms' performance (Merono-Cerdan & Soto-Acosta, 2007).

Information capability is the ability to offer sufficient quantity of information about services and products as well as the firm to customers (Zhu, 2004; Lin & Lin, 2008). Online materials allow firms to present their information to diverse services levels and various customer target group. Corporate website information should reduce vagueness and ambiguity for several differing explanations of situation (Daft & Lengel, 1986). According to Zhu (2004), a good e-commerce portal should provide deep products information, enable customers to search for information and provide product reviews.

Lin and Lin (2008) point out that amazon relies on its website to provide product information. In the event that a consumer wishes to inquire about additional items, the e-commerce system will provide search capability. Further, business firms use various retailing capabilities such as catalogues, flyers and online advertising for dissemination information to targeted customers; they recommend buying of products or services from the website (Choi & Park, 2006).

Transaction EC can be described as ability to conduct online transactions capability such as buying, online payment and provision of web security (DaSilveira, 2003). Transaction cost model postulates that companies endeavor to minimize costs. According to Shah, Braganza and Morabito (2007), e-commerce innovations provide cost advantages to a firm in two ways. First, it is through reduction of transaction costs of merchants and secondly,

by increasing transactions that improve operational effectiveness and profitability. This also serves as a strategic advantage (Porter, 2008). Ho, Kauffman and Liang (2007) assert that consumers are likely to scrutinize the products they should purchase from a website just like they conduct their real purchases in stores.

Customization of e-commerce capability is the ability to improve customer interactions through personalization of products or services (Zhu, 2004). Customization includes online registration, online product recommendation, content personalization, account management and real-time support. Configuration capability enables users to personalize products according to their tastes and preferences. Online recommendation is the ability to provide real-time online product recommendations. Real-Time Support is technical help dealt with via online representatives through voice communication or live chats (Zhu & Kraemer, 2005).

Back-end integration e-commerce capability is the ability of a firm to forge a strong electronic integration to facilitate inventory management, coordination and fulfilment between back offices and external users (Zhu, 2004). In addition, Asghar, Jahanshahi and Zhang(2013) argue that at the back-end, capability decreases incompatibility of information systems. In so doing, it effects data integration among various databases so as to provide integrated accounts for customers. This study used Information e-commerce

capability, Transaction e-commerce capability, Customization e-commerce capability and Back-end Integration e-commerce capability as the measures of E-commerce Capability as recommended by Zhu (2004) and Merono-Cerdan and Soto-Acosta (2007).

1.1.3 Competitive Advantage

Porter (2008) describes competitive advantage as the benefits gained by an organization through combination of attributes and resources of a firm to outperform the other firms in the same industry. The study of competitive advantage has attracted intense research interest due to the modern-day issues regarding attaining superior performance in today's enormously aggressive operating environment. Barney (1991) views an enterprise as having a strategic advantage if it has implementing distinctive and inimitable strategies not simultaneously being deployed by a current competitor.

The concept of competitive advantage is concerned with a firm finding profitability by developing basic strategies for creating value for its customers and differentiating itself from its competitors. As such, it becomes the first choice in the relevant field (Cooper & Porter, 2002). Bhatt and Grover (2005) postulate that the capability of e-commerce has become a key tool for provision of competitive advantage to firms by enabling banks to reach new territories, improving service delivery and increasing customer satisfaction.

Customer satisfaction has emerged as a crucial strategy that a business organization can use to obtain competitive advantage. According to Porter (2008), the relationship between customers and business firms has strongly developed to a direction where the customers have a dictating position in the sense of bargaining power. With such power, customers have become more demanding towards service providers. Many industries, especially the service industry, are under the mercy of their customers. Gaining competitive advantage in today's service firms is a very serious task for management. They also need to find a way to deliver superior value to their customers through technological innovations such as e-commerce capability (Johnston & Clark, 2008; Nguyen, 2012).

Lee, Park, Chung, and Blakeney (2012) argue that in the banking industry, consumer behavior is task-oriented; customers may select from several channels as discussed earlier. Khan and Haseeb (2015) assert that there is a correlation between customer satisfaction and firm performance. Further, customer satisfaction measurement should consider an understanding of the gap between customer expectations and performance perceptions.

Banks do business in competitive surroundings. In order to offer differentiated products and services from the websites, they will be predisposed to underscore unique attributes of website design. These include information about products and services, navigation, facilitating online transaction and account management with a view to addressig the issues

of various customer groups (Floh, Zauner, Koller, & Rusch, 2013). According to Floh et al. (2013), the UTAUT model reveals the existence of significant correlation among technology, competitive advantage and performance in firms.

UTAUT constructs of expected performance, expected effort, facilitating conditions and social influence are important in influencing use behavior of e-commerce websites and that sufficiently motivates consumers to transact online and that impact on the overall firm's performance (Venkatesh, Brown, Maruping & Bala, 2008). In connecting customer satisfaction and performance, Wang & Shieh (2006) postulates that customer satisfaction is the level of service quality performance that meets customer expectations.

Wang and Shieh (2006) contend that customers are the cornerstone of any commercial enterprise. Firms that do not meet consumer expectations more often record a drop in profits. This is why numerous studies have attempted to establish factors influencing firm performance. Therefore, the current study uses customer satisfaction index as a measure of competitive advantage (Johnston & Clark, 2008; Nguyen, 2012).

1.1.4 Business Operating Environment

Given the complexity of domain field of IT value for organizations (Fink, 2011), researchers that examine the effect of e-commerce capability on firm performance consider some variables related to business environment as moderators. Fernando (2011) describes business environment as a firm's internal and external forces that influence its activities and performance. Business environment comprises customers, suppliers, competitors, government, political, legal and technological factors. According to Akanni, Oke and Akpomimie (2015), business environment can be viewed through the legal framework upon which the firm operates; this is done through the laws and regulations that guide the operations of the business in question.

Kenya's Vision 2030 economic blue-print recommends three key pillars for the nation's financial sector: efficiency, stability and access to financial services. Hence, for Kenya to realize this Vision 2030, the banking sector is a core element that continues to spearhead the projected economic growth course (Njeule, 2013). CBK issued a new set of her regulatory requirement that became active on 1st January, 2013. Commercial banks need to adhere to these prudential guidelines.

According to CBK (2015), the CBK regulatory framework deals with a broad range of concerns including implementation of regulatory frameworks. The sustainability and

development of any economy is closely related to a sound and healthy banking sector. Therefore, the soundness of the banking system has always been a key issue not only for domestic governments but also for international regulatory bodies and organizations.

Banks function in a dynamic business environment; the accelerating technological developments, innovations, and new experiences usher into the daily life of banks, new rules and regulations (Akanni, Oke & Akpomimie (2015). Legal framework determines and defines the opportunities for a firm in a country (Chin, Gan, Heng, Lim, & Soo, 2013). This is because a growing economy establishes operational scope for the firm existence as well as for the establishment of new ones. Consequently, economists stress that sound understanding of legal is crucial for understanding economic development.

Government regulation influences the financial services industry in many ways. However, the specific impact depends on the nature of the regulation. Existing and new government regulations can suppress innovations and drive up costs. Conversely, too little can lead to mismanagement, corruption and collapse. Strong regulatory is correlated with efficiency in banks only in nations with autonomous regulatory bodies (Vianney, 2013). Besides, autonomy together with a proficient regulatory body may improve performance of banks.

Regulatory frameworks that promote e-commerce investment and allow business organizations to make adjustments necessary to take advantage e-commerce capability are expected to perform better. Considering that the above aspects and players can influence the prospects of a firm, senior management should antedate their influence to take embrace opportunities, lock out rivals and evaluate their effect on performance of the firm (Nicolau, 2005). Therefore, this study uses CBK regulatory requirements to measure the moderation effect of business operating environment on the relationship between e-commerce capability and performance of banks in Kenya (Vianney (2013).

1.1.5 Commercial Banks in Kenya

Kenya's banking industry history dates back to the pre-colonial era when the National Bank of India opened a branch in Kenya. The Companies Act, the CBK Act and the Banking Act form the fundamental controllers and governors of the banking industry in Kenya. The capital markets authority oversees the listed banks. Commercial banks in Kenya are grouped into three categories by means of indices namely; large banks, medium-size banks and small banks (CBK, 2015).

The CBK report further indicates that a bank with an index of five per cent or more is categorized as a large bank. A middle level bank has an index ranging between one per cent and five per cent whereas an index under one per cent represents a small bank. As at

31st December 2016, large commercial banks in Kenya were seven, accounting for a market share of 58.21 per cent. Medium commercial banks were twelve accounting for 32.42 per cent market share while the small commercial banks were twenty one, having a combined market share of 9.24 per cent.

Currently, there are 45 licensed commercial banks in the Republic of Kenya although data will be collected for 43 banks since financial statements for the two banks do not exist for the year 2016 - 2017 (CBK, 2017). The commercial banks provide both corporate and retail banking services. However, a small number, chiefly the larger banks, offer other services, including investment banking. The Kenyan banking sector has experienced colossal development in the last five years, extending towards the East African Region. This growth can be attributed to huge investments in ICT with the objective of improving customer service quality.

E-commerce innovations that have been adopted by commercial banks in Kenya include mobile banking and internet banking solutions. According to Kihumba (2005), Kenya's banking sector moved a landmark higher in the year 2005; by providing Kenya Electronic Payment and Settlement system (KEPSS). The adoption of electronic banking technologies was aimed at decongesting banking halls and reducing long queues.

1.2 Statement of the Problem

Commercial banks play a key role in the economic growth of a country. They are usually recognized for their contribution to the monetary operations, employment, innovation and wealth creation of a nation (Ongore & Kusa, 2013; CBK, 2015). Vision 2030's financial pillar aims to convert Kenya into a middle-income nation that provides high quality of life to its citizens by improving access and deepening of financial services (Republic of Kenya, 2008). To achieve this, the Government of Kenya (GoK) through the CBK has provided an enabling business operating environment such as regulatory framework. Such include regulation of interest rates to ensure that commercial banks contribute towards realization of the envisaged Vision 2030 prosperous economy.

In response to the enabling environment provided by the government, commercial banks have heavily invested in e-commerce solutions comprising mobile and internet banking solutions (CBK, 2015). Despite these initiatives by the government and banks, commercial banks have presented mixed results in terms of their performance. According to World Bank (2017), profitability of commercial banks has been declining across the years. Profits of commercial banks in Kenya measured in ROE were 21.99% in 2012, a drop from 23.1% in 2011. A decline in profitability was also witnessed in 2013, 2014 and 2015 as the ROE dropped to 20.9%, 20% and 17% respectively.

According to the CBK report (2017), in 2016 and 2017, profitability of commercial banks declined between 4% and 10 %. Similarly, in the first quarter of 2017, listed banks recorded 8.6 percent a decline in earnings per share (EPS) growth as compared to an average growth of 13.6 percent in the first quarter of 2016. The declining performance of commercial banks is a concern not just to the banks management but also because the financial industry is largely depended on commercial banks who are the main drivers of the Kenyan economy. Consequently, the collapse of the banking sector could eventually collapse the economy.

The potential effect of E-commerce capability on performance of commercial banks has raised important research and policy issues. Even though e-commerce has been mentioned to play a crucial part in overall performance of banks, empirical literature is yet to confirm the significance of e-commerce capability (Accenture, 2008). According to Adhola (2004) as cited by Muathe (2010), there exists a debate within the Kenyan context on whether adopting electronic solutions improve firm performance. Despite attempts by previous studies to explain the effect of e-commerce capability on banks, performance is still misconstrued (Mabrouk & Mamoghli, 2010; Huang & Lee, 2013).

Abualloush, Bataineh and Aladwan (2016) observe that, to effectively improve performance, firms should effectively cope with technological innovations; they should

understand technological changes and capability presented by e-commerce. Das and Teng (2000) and Kuang (2011) identified information, transaction, customization and skills EC as the crucial resources that firms need to successfully compete and improve performance.

Notably, Das and Teng (2000), Zhu (2004) and Kuang (2011) focused on the manufacturing sector which is a different operating environment from banking sector, hence creating a contextual gap. The studies utilized exploratory research design which lacks scientific rigor for establishing cause-effect. Thus, these studies were not intended to provide conclusive evidence, therefore posing a knowledge lacuna. The current study was carried out on commercial banks in Kenya and used explanatory research design to identify the extent and nature of cause-and-effect relationships between the variables. The design also provides advantages of replication and greater levels of internal validity.

These studies by Das and Teng (2000), Zhu (2004) and Kuang (2011) ignored business operating environment of the firm and competitive advantage dimensions that affect the relationship between e-commerce capability and performance which is a cause of inconclusive empirical results. Further, according to Zhu (2004), skills cannot be categorized as EC whereas back-end integration was ignored yet it is a crucial EC, thus creating a conceptual gap.

Similarly, Zhu (2004) used information, transaction, customization and back-end integration as the e-commerce capabilities that a firm can leverage. The study found EC to have a significant effect on performance of manufacturing firms. This study utilized ROA only to measure performance of manufacturing firms. However, ROA has a limitation in that it does not incorporate the debt and equity of a firm. This study considers both ROA and ROE. ROE is recommended as a measure of performance because it considers the capital structure.

In view of the gaps documented above, this study sought to fill in the existing gaps and establish the effect of E-commerce capability on performance of commercial banks in Kenya. In addition, this study incorporated business operating environment as a moderating variable as well as competitive advantage as a mediating variable.

1.3 Objective of the Study

The study was guided by the following objectives.

1.3.1 General Objective

To investigate the effect of E-commerce Capability on Performance of Commercial Banks in Kenya.

1.3.2 Specific Objectives

The specific objectives of the study were to;

- i) Establish the effect of information capability on performance of commercial banks in Kenya.
- ii) Analyze the effect of transaction capability on performance of commercial banks in Kenya.
- iii) Assess the effect of customization capability on performance of commercial banks in Kenya.
- iv) Analyze the effect of back-end integration capability on performance of commercial banks in Kenya.
- v) Determine the moderating effect of business operating environment on the relationship between e-commerce capability and performance of commercial banks in Kenya.
- vi) Determine the mediating effect of competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya.

1.4 Research Hypotheses

H₀₁: Information capability has no significant effect on performance of commercial banks in Kenya.

H₀₂: Transaction capability has no significant effect on performance of commercial banks in Kenya.

H₀₃: Customization capability has no significant effect on performance of commercial banks in Kenya.

H₀₄: Back-end integration capability has no significant effect on performance of commercial banks in Kenya.

H₀₅: Business operating environment has no significant moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.

H₀₆: Competitive advantage has no significant mediating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.

1.5 Significance of the Study

The findings of this study offer valuable insights and a basis for understanding the effect of E-commerce capability on performance of commercial banks in Kenya. Bank managers and other firms' policy makers will benefit from the pool of knowledge advanced by the study findings; they will understand the effect of e-commerce capability on performance of a firm. This will assist them to formulate sound policies regarding leveraging their key e-commerce capability in creating and sustaining competitive advantage that leads to improved performance.

The study will contribute to the body of knowledge in the field of information systems and firm performance. Further, the study findings underline the importance of maximizing on e-commerce capability to achieve better firm performance. This study is also of interest to scholars and researchers as part of their literature for future research. In conclusion, in testing the conceptual framework, the study provides grounds for future studies on the effect of e-commerce capability on performance of commercial banks.

1.6 Scope of the Study

This study covered the forty three commercial banks operating in Kenya for the financial year 2016/2017. The choice of the financial year 2016/2017 was because of the high rate of change of technology in the banking sector. According Buchanan and Huczynski (1985), the technology used by any organization changes from time to time. Moreover, Information Technology Infrastructure Library (ITIL), posits that each version of business application is made obsolete by the succeeding upsurge of developments (ITIL, 1999).

The choice of commercial banks was informed by the fact the Kenyan financial system is bank-based and also their data was readily available online. Further, banks had heavily invested in e-commerce and that represented a business opportunity to offer new products and services (Keen, 2001). The study used four variables: independent variable as e-

commerce capability; mediating variable as competitive advantage; moderating variable as business operating environment and dependent variable as performance.

1.7 Limitations of the Study

The study limitations included shortage of relevant literature in Kenya and Africa relating to EC and commercial banks performance. However, the researcher used studies done in the developed countries to develop conceptual arguments and contextual gaps and justification with competition among Kenyan commercial banks becoming stiffer day by day and new banks opening up, banks are constantly upgrading their websites. To solve this issue, the researcher only focused on the commercial banks which have been operational in 2016/2017 financial year.

1.8 Organization of the Study

The thesis is organized into five chapters. The first chapter covers the background, statement of the problem, the objectives of the study, research hypotheses, significance of the study, scope of the study, limitations of the study and structure of the proposed study. Chapter Two deals with empirical and theoretical literature review on the research topic, summarizes the literature and delineates the research gaps. It also gives the conceptual framework. Chapter Three covers methodology adopted in conducting the study. Chapter

Four focused on the discussion of results. The last chapter, five presents the summary, conclusion and recommendations made by the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theories that anchor this study. The chapter presents a critical review of empirical literature on e-commerce capability (EC) and performance and a summary of the research gap. The conceptual framework is presented diagrammatically, depicting the relationship between e-commerce capability as the independent variable, firm performance as the dependent variable, competitive advantage as the mediation variable and external business environment as the moderation variable.

2.2 Theoretical Literature Review

This study is grounded on the Unified Theory of Acceptance and Use of Technology (UTAUT), Dynamic Capability Theory (DCT) and RBV Theory. These theories helped in explaining the effect of E-commerce capability on CA and performance of commercial banks in Kenya.

2.2.1 Unified Theory of Acceptance and Use of Technology

Venkatesh, Morris, Davis and Davis (2003) advanced the Unified Theory of Acceptance and Use of Technology (UTAUT) Theory by merging eight technology acceptance models. The eight models comprise Theory of Reasoned Action, Theory of Planned Behavior,

Technology Acceptance Model, Diffusion of Innovations, Socio-Cognitive Theory, Motivation Model and Model of Personal Computer (PC) Utilization. The UTAUT attempts to elucidate user intentions to use technology and actual use behavior. This theory was also adopted by Muathe (2010) in explaining adoption of information and communication technology (ICT) in health facilities in Kenya.

UTAUT identifies four crucial constructs that determine technology acceptance and use behavior. These are expected performance, expected effort, social influence and facilitating conditions. Gender, age, experience, and voluntariness constructs are posited to mediate the relationship between user acceptance and use (Venkatesh *et al.*, 2003). Studies by Oshlyansky, Cairns and Thimbleby (2007) indicate UTAUT as a useful tool in explaining innovations acceptance and use across different cultures, viewing it as a robust theory with higher explanatory capacity unlike other technology acceptance theories.

According to Rahman (2013), despite the worldwide reach of e-commerce, not all nations have taken advantage of it. There is a big gap in internet and e-commerce adoption between the developed and developing nations. The researcher further notes that divergent factors of local environments such as socio-economic create high variance in the reception and development of e-commerce in various sections of the world. Unless the e-commerce participants understand e-commerce acceptance issues, e-commerce endeavors can be

greatly impeded. UTAUT constructs of expected performance, expected effort, facilitating conditions and social influence have been found to significantly affect use behavior of e-commerce websites; that sufficiently motivates consumers to transact business online. This positively impact on the overall firm's performance.

Venkatesh, Brown, Maruping and Bala (2008) identified facilitating conditions as one of the constructs that influence individual's perception and use behavior. According to the researcher, the availability of technological resources such as navigation capability, search capability, information availability, content usefulness, active links, customization, transactions support and accessibility have considerable impact on individuals' behavior on use and firm performance. Therefore, this theory informs information, transaction and customization variables of the study.

The UTAUT Theory is useful to this study since it provides the basis of understanding acceptance and use of technology such as e-commerce which is a key concept in this study. Additionally, studies have revealed that for firms to successfully accomplish superior technology administration, correct IT solution is essential (Benbasat & Zmud, 1999).

2.2.2 Dynamic Capability Theory

The Dynamic Capability Theory (DCT) was founded by Teece and Pisano (1994). It was further advanced by Teece, Pisano and Shuen (1997) and Eisenhardt and Martin (2000). Dynamic capability is the capacity of a firm to deliberately adjust a firm's asset base. Researchers of strategic management have recently observed the emergence of dynamic capability as a theory that attempts to elucidate how certain firms seem better placed to gain competitive advantage and improve performance in dynamic business environments (Petroni, 1998; Zott, 2003; Pillai, 2006). Dynamic capability, is an effectual strategic option that allows firms adopting technology such as e-commerce to respond to shifting market situations. This is by creating and renewing their firm capability, thus attaining and sustaining CA (Winter, 2003).

Dynamic capacities can be differentiated from operational abilities, which relate to the present operations of a firm. Dynamic capability is the ability of a firm to deliberately make, augment, or adjust its asset base, including e-commerce (Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece, & Winter, 2007). The essential supposition of the DCT is that the core capability ought to be utilized to revise short-term competitive positions that can be appropriated to develop longer-term competitive edge.

Zahra, Sapienza and Davidsson (2006) argue that although dynamic abilities surface from related histories of firms and are distinctive and unmistakable procedures, they may share ordinary characteristics crosswise over firms, even though they vary in their viability. In addition, dynamic capability does not automatically lead to a competitive edge, but may contribute in performance. Rindova and Kotha (2001) applied dynamic capability modes to study how firm performance and CA of electronic business dynamically evolve.

2.2.3 Resource-Based View Theory

The Resource-Based View (RBV) Theory was initially developed by Wernerfelt (1984). According to Kraaijenbrink, Spender and Groen (2010), major advancements made by numerous researchers, most notably Barney (1986a, 1986b, 1991a), Peteraf (1993) and Teece (1997). Subsequently, fields such as information systems, strategic management and others have used RBV Theory (Wade & Hulland, 2004).

According Peteraf and Barney (2003), the RBV underlines the firm's resources as the key determinants of competitive edge and firm performance. While valuating the sources of CA, the RBV Theory assumes that firms with a strategic group may be heterogeneous in terms of the resources that they control. Further, asset heterogeneity may continue for some time because the resources used to execute firms' strategies are not flawlessly versatile crosswise over firms.

Milgram (1999) observes that firm's resources cannot be assessed in segregation; a single resource may not be as important as a set of them may be. Therefore, one resource produces more noteworthy returns when utilized in combination with others (Black & Boal, 2007). This may clarify why firms may utilize similar e-commerce technologies and obtain varying outcomes. Indeed, a synergistic mix of technological innovations with other firm resources has apparently improved firms' performance (Huang, 2010).

Matta, Fuerst and Barney (1995) have used RBV Theory to assess the correlation between IT and EC and firm performance. Studies by Soh and Markus (1995) show that e-commerce value to businesses is anchored on a firm's expertise to align technological innovations to firm objectives rather than the technology itself. In addition, Zhu and Kraemer (2005) assert that the effect of technology on business is correlated to the degree to which a technological tool is used in the critical areas of the firm's operations.

The RBV Theory was used before to examine the effect of e-commerce on performance (Santhanam & Hartono, 2003). Studies have found out that an enterprise's ability to effectively leverage EC can result in improved financial firm performance. RBV is useful to this research since firm financial decisions taken by a firm are largely influenced by the resources at its disposal. Consequently, RBV Theory postulates that firm is a package of

capability: its performance is strongly dependent upon deployment of these specific resources (Das & Teng, 2000).

This study was anchored on UTAUT which is a combination of eight theories. The theory explains technology acceptance and use across different cultures. It is also a robust theory with higher explanatory capability than the other theories of technology acceptance. Dynamic capability theory and RBV Theory also underpin the study. DCT has been extensively used to study the capability of e-commerce and CA.

DCT helps in identifying key dynamic capabilities which include selecting supporting technology, matching with financial opportunities, effecting business innovation, understanding consumer value and creating alliance with rivals. The RBV Theory addresses an identity of a firm as its nature and source of strategic capability. It explains how firms can use heterogeneous resources at their disposal to build sustainable advantages that are inimitable by rivals. The theory has been tested and proved to be robust in explaining the value of e-commerce to firms.

Table 2.1 Summary of Theoretical Review

Theory	Proponent	Argument	Contribution to the current study
Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh, Morris, Davis and Davis (2003)	Four crucial aspects, including performance expectancy, effort expectancy, social influence, and facilitating conditions determine technology acceptance and use behavior.	Helps in understanding key factors that influence users' acceptance of technology
Dynamic Capability	Teece, Pisano and Shuen (1994)	Focuses more on the issue of competitive survival in response to rapidly changing contemporary business environment.	Helps takes into account digital, information and network economics.
Resource-Based View	Wernerfelt (1984)	To change a short-run competitive advantage into a sustained competitive advantage requires resources that are heterogeneous in nature and not perfectly mobile	Helps in identification of crucial firm resources for competitive and advantage and firm performance

Source: Researcher (2017)

2.3 Empirical Literature Review

This section discusses the literature pertaining to the research objectives on EC. These include information, transaction, customization and back-end integration, moderating and mediating variables. The study highlights the existing gaps in relation to the objectives of the study and issues of interest to it.

2.3.1 E-commerce Information Capability and Firm Performance

Lederer, Mirchandani and Sims (2001) found that firms that used the internet to publish products and services information achieved flexibility, customer retention and improved performance. The exploratory study focused on electronic shops retailing online. The study used data collected from a sample of 15 companies involved in online shopping. However, this study was conducted in the context of developed countries such as the United States of America (USA); the situation might be different in Third World nations, Kenya included. A sample size of 15 is actually quite small. Such a small sample size increases the likelihood of a Type II error skewing the results; this decreases the statistical power of the study.

The current study on the effect on E-commerce capability on performance of commercial banks in Kenya used explanatory research design. That is best suited for establishing the cause-effect relationships unlike exploratory design whose results can only be regarded as preliminary hence cannot be relied upon. The study also adopted a census approach in order to enhance validity.

Zhu (2004) established that firms that use e-commerce, were enabled to access new markets, create new distribution channels and attract potential and new customers. This study used information-transaction-customization-back-end integration dimensions to

measure EC in the manufacturing industry. The study also used firm size, a moderating variable. The cross-sectional study was anchored on RBV Theory and used exploratory research design. Exploratory research design is a weak design whose findings should be regarded as preliminary hence cannot be entirely relied upon.

The current study is anchored on IT theory, UTAUT. It uses explanatory research design because it has power to connect ideas to establish cause and effect between variables. The study also considers the moderation effect of the government regulation since commercial banks are highly regulated unlike manufacturing firms. Merono-Cerdan and Soto-Acosta (2007) observed that there is a relationship between firm e-commerce capability: information and customization capability strongly support the positive performance of a firm. Moreover, IT resources were not related with e-business value. The exploratory survey used a questionnaire for data collection and it was anchored on RBV Theory only. The current study will be anchored on several theories. Further, it will use explanatory research design because apart from establishing the relationship between e-commerce capability and performance, the study aims to establish the effect of E-commerce capability on performance.

Wanguku (2012) studied the effect of e-commerce on the performance of airline using multiple regression analysis. The study employed a descriptive research design. The

regression results show that the numbers of online passengers had a weak positive correlation with performance. The study involved the airlines industry, ignoring other aspects such as the business environment that contribute to performance. The current study involved commercial banks in Kenya, factoring in the moderation effect of the business environment.

2.3.2 Transaction Capability and Firm Performance

Croom (2000) revealed that web-based procurement leads to reduction of administration costs, improved expenditure control and increased profitability. The study results further show that improved processing ability can be attained by using e-commerce to cut down on expenses. The study employed Delphi method to determine the impact of web-based order processing system for the procurement of management, repair and operation items. The study used exploratory design; it sought to explore the opportunities and capability of web-based procurement systems. The current study used explanatory research design to establish the effect of E-commerce capability on performance of commercial banks.

DaSilveira (2003) found that e-commerce transaction capability, including the ability to conduct online transactions such as buying, online payment and provision of web security can minimize operational costs and lead to profitability. The study revealed that transaction

capability works as a new sales conduit; its effective results must be visible in the sales and in the value of administration and income.

The findings of Hernando and Nieto (2007) reveal that adopting the web as a conveyance channel leads to diminishment in overhead costs especially, staff, promoting and IT which translates to an improvement in bank profitability. The investigation additionally shows that web is utilized as a supplement to, as opposed to a substitute for, physical branches. Further, the study found out that this impact differs after some time with regard to expenses and revenue structure which are the principle drivers of improved performance. The study used time-series data as a single dimension. This way, it might fail while using complicated behavioral hypotheses unlike panel data models. The current study used cross-sectional data. This is because it enables the researcher to answer important monetary questions that cannot be answered through time-series data sets.

Mehra (2013) found out that fraud-related losses amounted to an average of US\$9000 for every US\$1 million in revenue. The study findings reveal that firms which use e-commerce have the ability to detect fraud as it is about to happen by using consumer data, transactions history, website file logs, social media feeds and geospatial data from maps as well as data generated smartphone applications. In the Kenyan perspective, CBK (2015)

points out that the increased use of IT innovations has resulted to IT related frauds in the recent years. However, this argument has not been empirically tested.

2.3.3 Customization Capability and Firm Performance

Customization is a website measure that allows users to both personalize what they see on the website. Customization capability is concerned with an unswerving customer base; customers are more like future alternatives or intangible resources; their impact on the performance of the firm is strategic, future-oriented and subtle (Zhu & Kraemer, 2005). E-commerce is allowing businesses to compete by delivering advantages to customers at lower costs and better decisions (Malkawi, 2007). For instance, at the front end, customer-facing website functionalities help firms provide real-time information to consumers, update product and pricing information; they facilitate self-service via online account management and research tools, thereby improving customer services and expanding revenue sources.

Kiron, Prentice and Ferguson (2012) in their US study revealed that customization capability and transaction capability translated into improved performance. The survey was conducted on 2,500 business executives, managers and analysts from organizations located around the world and not commercial banks in particular. However, the findings also revealed that some analysts do not recognize the analytical tool of e-commerce as an

important path to performance. The current study seeks to establish the overall effect of customization capability on performance.

Another study by Davenport and Patil (2012) found out that firms that used credit cards for payment by relying on their websites to provide customized products performed better financially. The study findings also revealed that many firms utilized such customized information attract new customers and to provide an online transactions platform. However, it would be difficult to offer new products without online recommendations by the customers. Biesdorf, Court and Willmott (2013) explained that by analyzing website data, online firms received notifications when competitors lowered their prices of services and products. This study focused on customization which is only one dimension of e-commerce capability; it left out the other dimensions.

Koutsabasis, Stavrakis, Viorres, Darzentas, Spyrou and Darzentas (2008) assert that the first primary application of e-commerce is to offer customized services or products. The exploratory study contends that customers characteristically prefer to do business with the same firm via diverse channels. In addition, voluminous data generated by e-commerce platforms can be personalized in real time. Instantaneous data analytics allow business firms to provide customized services and products, including advertising. Over and above, customization enables firms to segment customers and serve them with promotional

information on new offers. The study lacked theoretical backing. The current study was anchored on UTAUT and other relevant theories.

Liebowitz (2013) established that customization could lead to an increase in sales by more than 10% and contribute to approximately five to eight times the ROI on advertising costs. Wine.com used customized marketing to increase her sales volumes (Zhao 2013). Similarly, bikeberry.com used customer data, buying patterns and preferences to boost sales. Because of this marketing strategy, the company sales increased 133 percent; customer leads increased by 200 percent (Jao, 2013). Unfortunately, these studies have not been carried out on banks but manufacturing firms. Therefore, given this contextual the current study is aimed at assessing the effect of customization capability on performance of commercial banks in Kenya.

2.3.4 Back-end Capability and Firm Performance

An exploratory study by Zhu (2004) found out that there exists a positive relationship between e-commerce back-end integration and firm performance. The study was anchored on RBV Theory, using exploratory research design whose findings can only be regarded as preliminary. Further, the study was based on manufacturing firms in China, a developed country whereas Kenya is a developing country. Given the theoretical, contextual and a methodological gap existing in the study, the current study was anchored on IT Theory,

UTAUT, DCT and RVB Theory. The study also used explanatory research design; it was conducted on commercial banks in Kenya.

Soto-Acosta and Meroño-Cerdan (2008) established a correlation between e-commerce capability and firm performance. A random sample of 1010 was selected for the study. Research data was analyzed and hypotheses tested using structural equation modelling. The results revealed that EC was not related with firm performance. Therefore, the current study seeks to ascertain if EC influences performance. The study used ROI to measure performance. This measure does not consider the intangible aspect of an investment. Indeed, it could inspire misunderstanding by the investors, thus leading to wrong choices of investments. Therefore, the current study used ROA and ROI to overcome the weaknesses of ROI.

2.3.5 E-commerce Capability, Business Operating Environment and Firm Performance

Zhu and Kraemer (2005) sought to determine the factors that lead to value creation of e-business using the technology-organization-environment (TOE) model. The study surveyed 612 firms across 10 countries in the financial services industry. The study identified technology integration, firm size, firm scope, financial resources, competition intensity, and regulatory environment as the factors that may affect value creation of e-

business. Technology integration emerged as the strongest factor for e-business value, while financial resources, firm scope, and regulatory environment were also found to significantly contribute to e-business value.

The current study used explanatory research design. The study is grounded on UTAUT Theory in explaining innovations acceptance since it is a more robust theory with higher explanatory power as compared to other technology acceptance and use model. The study also factored in a business environment as a moderation variable and competitive advantage as a mediating variable.

Delis, Molyneux and Pasiouras (2011) established that bank regulations and incentives that stimulate private monitoring and restrictions on banks' operations positively affected efficiency. The study was keen on establishing the relationship between the regulatory framework and performance of banks; it was carried out in 22 countries over the period 1999–2006, using Malmquist index and bootstrap regressions. Conversely, policies regarding capital requirements and supervisory capacity failed to yield a positive effect on productiveness.

Njeule (2013) indicates that there was significant variation on the performance of commercial banks due to variations in Capital Adequacy, Liquidity Management, Risk

Classification of Assets and Provisioning, Foreign Exchange Risk Exposure and Corporate Governance. The study investigated the effects of CBK Prudential Regulations of 2006 on the performance of commercial banks in Kenya. The descriptive research methodology was adopted in Njeule's study. The study results indicated this as an indication that CBK regulations influenced the performance of commercial banks. This current study assessed the moderation effect of CBK regulatory requirements.

Lee and Chih (2013) indicated that big and small banks were differently affected by bank regulation ratios. The study investigated the effects of regulations imposed by the China Banking Regulatory Commission (CBRC) on performance of banks. They used a profit model and Tobit regression model to determine the relationship between financial regulation and efficiency. They used the Ordinary Least Squares (OLS) regression model to determine the relationship between regulations and risks.

2.3.6 E-commerce Capability, Competitive Advantage and Firm Performance

Aranyossy (2010) sought to determine if e-commerce resources are associated with improved firm operational efficiencies or CA using exploratory research approach. The research was based on the RBV Theory. The unit of analysis was the Firm (ICT retail industry); the locus of value was firm level performance. Data was collected from primary and secondary sources, using correlation and regression analyses. The study findings

revealed that ecommerce improves performance of a firm. However, the study concentrated on retail industry and used exploratory research design which is a weak design. The current study focused on commercial banks, using explanatory design.

According to Kabue and Kilika (2016), the definitive objective of a firm is to achieve predominant performance. To achieve this superior performance, a firm in an industry must possess core competencies that are difficult for other firms in the same business to impersonate. The non-rare homogenous resources must be converted into unique and inimitable practices that market rivals cannot copy. Kabue and Kilika further posit that creation of the core competencies is the creation of firm cultures and values, shaped over time. In addition, an organization may lack the resources required to establish a source of sustainable CA. These resources may be preserved by other organizations not controlled by the organization.

Barney (1991) argues that CA founded on non-physical resources is inimitable by competitors hence a basis of sustainable CA. The argument is further supported by Kinyua, Muathe and Kilika (2015) who, using RBV Theory, identified knowledge, innovation and intellectual properties as key drivers and sources of a firm's CA. Intangible resources include human capital, intellectual properties and reputation. Human capital provides knowledge, skills, and decision making capability to the firm.

According to Porter (2008), customer satisfaction has emerged as a key strategy that a business enterprise can use to gain competitive advantage. The researcher argues that the relationship between customers and business firms has strongly developed to a direction where the customers have a dictating position in the sense of bargaining power. With this power, customers have become more demanding towards service providers. It can be argued that many industries, especially the service-oriented ones, are under the mercy of their customers. Gaining CA in today's service firms is a very serious task for management since they need to find a way to deliver superior value to their customers.

Contrary, Bernhardt, Donthu and Kennett (2000) conducted a study on US fast foods and failed to demonstrate statistically that there was a significant relationship between customer satisfaction and performance. Instead, they established that there was a correlation between customer satisfaction and performance. Similarly, Keisidou, Sarigiannidis, Maditinos and Thalassinou (2013) found out that neither customer satisfaction nor loyalty significantly impacted on the performance of banks, while other factors were significant.

The survey was carried out in the Greece banking sector. Primary data was collected regarding customer satisfaction and loyalty; the financial data of the banks was obtained

from banks' annual financial statements. A structural equation modelling was used to test the hypotheses. The current study tested the mediation effect of customer satisfaction.

Kombo (2015) found out that lower product or service transaction cost positively affected customer satisfaction. The study also reveals that customer satisfaction provides a basis for firms to enhance their relationships, even with the customers, thus enabling the firms to achieve their financial objectives. Additionally, the findings indicate that both satisfaction and dissatisfaction partially impact on the number of banking products and banks that customers choose to open accounts with.

Mithas, Krishnan and Fornell (2016) indicate that IT investments have a strong positive effect on customer satisfaction and firm profits. Using data on 109 USA firms for the 1994-1996 and 1999-2006 periods, these findings provide new insights to evaluate returns on technology investments by focusing on customer satisfaction. This is an important intangible and principal measure of firm performance. These findings extend past literature in information systems on the role of customer satisfaction as a construct that explains how technology-enabled benefits are passed on to customers. This study focused on manufacturing firms in US.

2.4. Summary of Empirical Review

Table 2.2 presents a summary of empirical literature reviewed, methods used findings, knowledge gap and contribution of the current study.

Table 2.2: Summary of Empirical Review and Research Gaps

Author	Study Title	Methodology	Objective	Findings	Knowledge Gap	Contribution of Current Study
Croom (2000)	The Impact of Web-Based Procurement on the Management of Operating	Exploratory research design	To determine the impact of Web-based order processing system for the procurement of management, repair and operation items.	Information processing capability of e-commerce enables significant cost reduction.	The study focused on retail industry. The study used exploratory design.	The current used explanatory research design to establish the effect of e-commerce capability on performance of commercial banks.
Lederer, Mirchandan and Sims (2001)	The search for strategic advantage from the World Wide Web	Exploratory research design Questionnaires to collect data	To determine how the Internet can be used to gain strategic advantage.	The study results revealed that firms that use the internet achieve improved information access, flexibility, customer retention and improved firm performance.	The study focused on electronic shops retailing online.	The current used explanatory research design to establish the effect of E-commerce capability on performance of commercial banks. The study factored in competitive advantage as a mediating variable and business environment as a moderation variable.
Zhu (2004)	The complementarity of information technology	To establish the business value of e-commerce capability and	RBV Theory exploratory research design Cross-sectional data	EC and IT infrastructure have significant effect on firm performance. This study was carried	The study used exploratory research design which is a weak design whose	The current study focused on the E-commerce capability on performance of commercial banks

	infrastructure and e-commerce EC: A resource-based assessment of their business value	IT) infrastructure on firm performance	from primary and secondary sources. Regression analysis	out on manufacturing firms.	findings should be regarded as preliminary hence cannot be relied upon.	using explanatory research design. Such design has power to connect ideas to establish cause and effect.
Hernando and Nieto (2007)	Is the Internet delivery channel changing banks' performance? The case of Spanish banks	To establish the impact of the adopting a transaction web site on performance	Time-series data regression analysis	Implementing e-commerce reduces overhead costs which translate into an improvement in bank performance	The researcher may fail to analyze a number of important economic questions using cross-sectional or time-series data sets	The current study used cross-sectional data
Merono-Cerdan and Soto-Acosta (2007)	External web content and its influence on organizational performance	To identify e-business resources and capability and to assess the correlation between those two variables and firm's performance.	RBV Survey Questionnaire Structural equation modelling	Web content has no relationship with e-business value. How ECe had a positive effect on procurement	No theory basis anchoring IT	The current study will use UTAUT Dynamic capabilities and RBV theories
Mabrouk and Mamoghli (2010)	Dynamic of financial innovation and performance of banking firms: context of an emerging banking industry	To assess the effect of adopting financial innovations of product innovation on performance of banks	Exploratory research design	Early innovation adopters of product innovation improve profitability while process adopters have a positive effect on profitability and efficiency. Electronic banking on banks' performance is still misconstrued	Exploratory research design is weak in explaining cause-effect	The current explanatory study sought to establish the effect of E-commerce capability on performance of commercial banks.

Mutevu (2015)	Effects of Technological innovations on performance of commercial banks in Kenya: A case of Equity Bank of Kenya	There is a positive relationship between mobile banking and internet banking transactions on the performance of commercial banks in Kenya	Case study Descriptive research design Questionnaire Descriptive statistics	Adoption of technological innovations by banks positively affects their performance.	The study design which is a weak design.	The current study covered all the commercial banks. The study used explanatory research design; data was analysed, using both descriptive and inferential statistics. The study also included business environment as a moderator and CA as a mediator
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Source: Researcher (2017)

2.5 Conceptual Framework

The conceptual framework presents diagrammatically the relationship among the independent variables, mediating variable, moderating variable and the dependent variable.

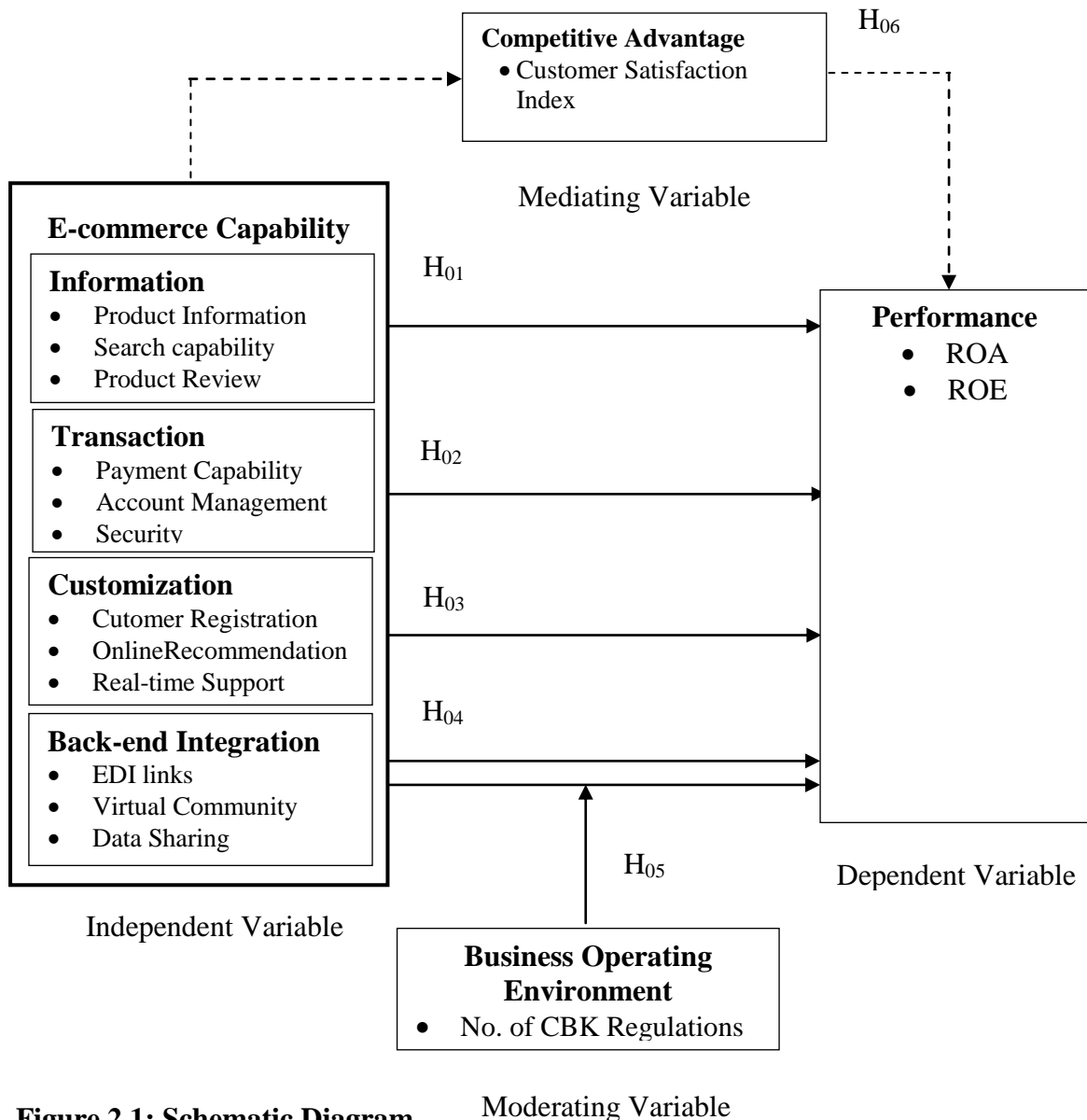


Figure 2.1: Schematic Diagram

Source: Researcher (2017)

Based on the conceptual framework and literature review, performance is the dependent variable, with two measures: ROA and ROE. The independent variable, EC has four measures: information, transaction, customization and back-end integration. Therefore, the study proposed the following hypotheses and sub-hypotheses from the first, second, third and fourth research objectives indicated hereunder.

H₀₁: Information capability has no significant effect on performance of commercial banks in Kenya.

H_{01a}: Information capability has no significant effect on ROA of commercial banks in Kenya.

H_{01a}: Information capability has no significant effect on ROE of commercial banks in Kenya.

H₀₂: Transaction capability has no significant effect on performance of commercial banks in Kenya.

H_{02a}: Transaction capability has no significant effect on ROA of commercial banks in Kenya.

H_{02b}: Transaction capability has no significant effect on ROE of commercial banks in Kenya.

H₀₃: Customization capability has no significant effect on performance of commercial banks in Kenya.

H_{03a}: Customization capability has no significant effect on ROA of commercial banks in Kenya.

H_{03b}: Customization capability has no significant effect on ROE of commercial banks in Kenya.

H₀₄: Back-end integration capability has no significant effect on performance of commercial banks in Kenya.

H_{04a}: Back-end integration capability has no significant effect on ROA of commercial banks in Kenya.

H_{04b}: Back-end integration capability has no significant effect on ROE of commercial banks in Kenya.

Based on the fifth objective, this study seeks to establish the moderation effect of business operating environment on the relationship between the e-commerce capability and performance of commercial banks in Kenya. Therefore, two sub hypotheses have been derived from hypothesis five as follows.

H₀₅: Business operating environment has no moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.

H_{05a}: Business operating environment has no significant moderating effect on the relationship between e-commerce capability and ROE of commercial banks in Kenya.

H_{05b}: Business operating environment has no significant moderating effect on the relationship between e-commerce capability and ROE of commercial banks in Kenya.

Based on the sixth objective, this study seeks to determine the mediation effect of Competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya. Therefore, the following sub hypotheses derived from hypothesis 6a and 6b have been proposed.

H₀₆: Competitive advantage has no significant mediating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.

H_{06a}: Competitive advantage has no significant mediating effect on the relationship between E-commerce capability and ROEs of commercial banks in Kenya.

H_{06b}: There is no significant mediation effect of bank competitiveness on the relationship between financial inclusion ROE of commercial banks in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was used to achieve the research objectives. Chapter sections include research philosophy, the research design, target population, empirical model, operationalization and measurement of variables. It also comprises data collection instruments, data analysis and presentation and ethical issues.

3.2 Research Philosophy

Scientific and social research studies can be guided by various philosophies. The three main philosophical stances are the interpretivism, pragmatism and positivism (Maylor, Blackmon & Huemann, 2016). A research philosophy can influence the research design and interpretation of the findings (Saunders, Lewis & Thornhill, 2007). Interpretivism as an epistemology contends that it is necessary for the researcher to recognize the differences between humans as social actors. Pragmatism advocates that an important determinant of the research philosophy employed is the research objective. Hence, these two philosophies are subjective.

This study adopted Positivism research philosophy because it seeks facts of social phenomena, regardless of the subjective status of individuals. Thus, it presumes that the

social world exists objectively, externally beyond human mind; it comprises facts structured in a law-like manner (Maylor, Blackmon & Huemann, 2016). Positivists believe that truth is steady; it can be observed and described from a goal-perspective, without meddling with the phenomena under study. The assumption is that occurrences should be confined and that observations ought to be repeatable (Saunders, Lewis & Thornhill, 2009).

Positivism has a long and rich chronicled tradition in that it is so engraved in our society that information claims not grounded in positivist philosophy are essentially rejected as unscientific hence, invalid (Hirschheim, 1985). It can be used to predict the premise of historical observations and clarified realities and their relationships. Further, research finding by Orlikowski and Baroundi (1991) and Alavi and Carlson (1992) established positivism philosophy to be the most popular in the study of technology. Therefore, this study adopted positivism research philosophy as recommended by Creswell (2009), Maylor, Blackmon and Huemann (2016).

3.3 Research Design

According to Saunders, Lewis and Thornhill (2007), research design can be classified as exploratory, descriptive and explanatory. An exploratory research attempts to establish if what is being observed can be explained by an existing theory; it lays the groundwork that

will lead to future studies. Once the groundwork has been established, the newly explored field requires more information through descriptive research. Descriptive research seeks to explain what is happening in more detail, filling in the gaps and extending knowledge. In addition, explanatory study attempts to connect ideas to establish cause and effect.

This study adopted explanatory non-experimental design as recommended by Saunders, Lewis and Thornhill (2009) and Were and Wambua (2014). Explanatory design was appropriate in explaining the characteristics of the variables of the study. At the same time, it sought analyzing the cause-effect relationship among variables; no manipulation of the independent variables is anticipated.

3.4 Empirical Model

Numerous models can be utilized in analyzing quantitative data that include Logistic, Tobit, Probit and Regression models. Logistic, Probit and Tobit are used when the dependent variable is dichotomous (Field, 2009 & Muathe, 2010). In this study, the dependent variable is continuous. As such, multiple linear regression model was the most suitable. Multivariate analysis was used to perform regression on the relationships among the various variables so as to establish the strength of each explanatory variable. The dependent variable, performance had two indicators: RAO and ROE.

Model 3.1 (a) sought to establish the effect of information capability, transaction capability, customization capability and back-end integration capability on ROA while Model 3.1 (b) sought to establish the effect of information capability, transaction capability, customization capability and back-end integration capability on ROE. Composite indices of the study variables were derived using a weighted geometric mean as suggested by Zhu and Kraemer (2005).

$$ROA_i = \beta_0 + \beta_1 IC_i + \beta_2 TC_i + \beta_3 CC_i + \beta_4 BC_i + \varepsilon_i \dots \dots \dots 3.1 (a)$$

$$ROE_i = \beta_0 + \beta_1 IC_i + \beta_2 TC_i + \beta_3 CC_i + \beta_4 BC_i + \varepsilon_i \dots \dots \dots 3.1 (b)$$

Where,

ROA_i = Return on Assets of Bank i at time t

ROE_i = Return on Equity of Bank i at time t

β_0 = Intercept Constant

$\beta_1, \beta_2, \beta_3, \beta_4$ = Beta Coefficients

IC_i = Information Capability of Bank i

TC_i = Transaction Capability of Bank i

CC_i = Customization Capability of Bank i

BC_i = Back-end Integration of Bank i

i = Bank 1, 2, 3 ... 43

ε = Error Term

3.4.1 Testing for Moderation

According to Whisman and McClelland (2005), moderation effect testing involves assessing whether the co-efficient of interaction term (e-commerce capability – EC - variables *Business Operating Environment) is statistically significant or assess whether it is simply an explanatory variable.

To analyze the moderation effect of business operating environment on the relationship between the e-commerce capability (information, transaction, customization and back-end integration) and performance. Models 3.2 (a) and 3.2 (b) were estimated to give the effect of the moderator on the relationship between the independent and the dependent variables.

$$ROA_i = \beta_0 + \beta_1 EC_i + \beta_2 BE_i + \beta_3 BE_i * EC_i + \varepsilon_i \dots\dots\dots 3.2 (a)$$

$$ROE_i = \beta_0 + \beta_1 EC_i + \beta_2 BE_i + \beta_3 BE_i * EC_i + \varepsilon_i \dots\dots\dots 3.2 (b)$$

Where EC is a composite index of independent variable E-commerce capability (EC) and BE is a composite index for business environment.

If the interaction between the independent variable (EC) and the moderator variables (BE) is not statistically significant ($p > 0.05$) then the business environment variable is not a moderator but an explanatory variable. On the other hand, if the interaction is statistically significant, then the moderation effect is supported (Whisman & MacClelland, 2005).

3.4.2 Testing for Mediation

A mediator variable is a variable that explains the relationship between the independent and dependent variables. To establish the mediation effect of competitive advantage on the relationship between the E-commerce capability and bank performance, a four step approach was used as recommended by Baron and Kenny (1986).

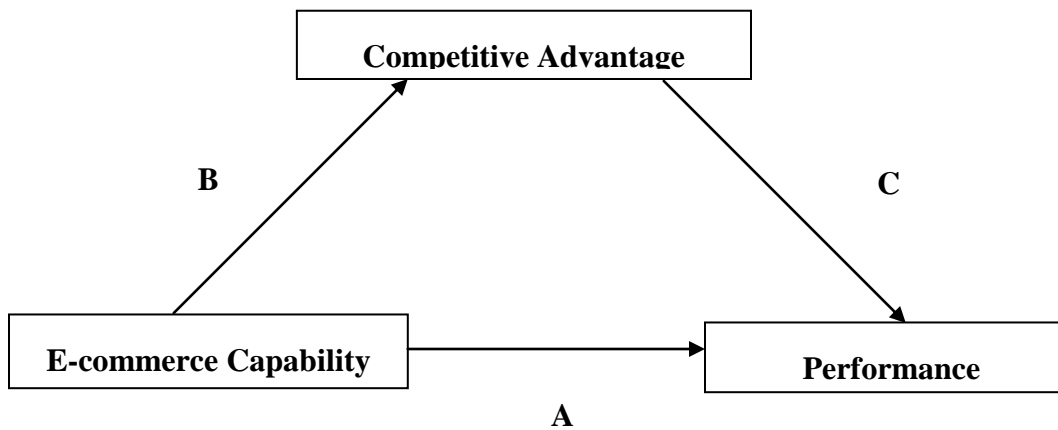


Figure 3.1 Mediation Model

Source: Researcher (2017)

Step 1

A simple regression analysis with EC predicting performance was conducted to test for path A.

The models are:

$$ROA_i = \beta_0 + \beta_1 EC_i + \varepsilon_i \dots\dots\dots 3.3 (a)$$

$$ROE_i = \beta_0 + \beta_1 EC_i + \varepsilon_i \dots\dots\dots 3.3(b)$$

Where:

ROA_i = Return on Assets of Bank i

ROE_i = Return on Equity of Bank i

EC_i = Composite index for e-commerce capability of Bank i

β_1 = Regression coefficient for e-commerce capability

The objective is to test whether EC is a significant predictor of performance. If β_1 is significant the EC is a significant determinant of performance.

Step 2

A simple regression analysis with EC predicting competitive advantage (CA) was conducted to test for path B.

The model is:

$$CA_i = \beta_0 + \beta_1 EC_i + \varepsilon_i \dots\dots\dots 3.4$$

Where:

CA_i = Composite Index for Competitive Advantage of Bank i

EC_i = Composite index for e-commerce capability of Bank i

β_1 = Regression coefficient for e-commerce capability

The objective is to test whether EC is a significant predictor of CA . If β_1 is significant, the EC is a significant determinant of CA.

Step 3

A simple regression analysis with CA predicting performance was conducted to test for path C.

The models are:

$$ROA_i = \beta_0 + \beta_1 CA_i + \varepsilon_i \dots\dots\dots 3.5 (a)$$

$$ROE_i = \beta_0 + \beta_1 CA_i + \varepsilon_i \dots\dots\dots 3.5 (b)$$

Where:

ROA_i = Return on Assets of Bank i

ROE_i = Return on Equity of Bank i

EC_i = E-commerce capability for Bank i

β_1 = Regression coefficient for Competitive Advantage

The objective is to test whether CA is a significant predictor of performance. If β_1 in the models 3.3a, 3.3b, 3.4 3.5a and 3.5b is not significant, then mediation is not possible. If it is significant, we proceed to Step 4.

Step 4

Multiple regression with e-commerce capability (EC) and competitive Advantage (CA) predicting performance was conducted.

$$ROA_i = \beta_0 + \beta_1 EC_i + \beta_2 CA_i + \varepsilon_i \dots\dots\dots 3.6 (a)$$

$$ROE_i = \beta_0 + \beta_1 EC_i + \beta_2 CA_i + \varepsilon_i \dots\dots\dots 3.6 (b)$$

Where:

ROA_i = Return on Assets of Bank i

ROE_i = Return on Equity of Bank i

EC_i = Composite index for e-commerce capability of Bank i

β_1 = Regression coefficient for e-commerce capability

β_2 = Regression coefficient for Competitive Advantage

ε = Error Term

Some form of mediation is supported if the effect of competitive advantage remains significant after controlling e-commerce capability. If e-commerce capability is no longer significant when competitive advantage is controlled for, then the findings support complete or full mediation. If both e-commerce capability and competitive advantage significantly predict performance, then this is a case of partial mediation.

3.5 Target Population

The target population was made up of 43 commercial banks licensed and registered as at 31st December 2016 as indicated by pappendix 11 (CBK, 2017). In Kenya, banks are classified into peer groups of Tier 1, Tier 2 and Tier 3. Tier 1 refers to the banks that control 49.90% of total market share in the country. Tier 2 refers to the medium-sized banks that control approximately 41.70% of the market share while Tier 3 are the small banks that account 8.40%% market share as shown in Table3.1.

Table 3.1: Distribution of Target Population

Peer Group	No. of institutions	Market share
Tier 1	6	49.90%
Tier 2	16	41.70%
Tier 3	21	8.40%
Total	43	100%

Source: CBK (2017)

3.6 Sampling Design and Procedure

The study adopted a census approach because of the small number of commercial banks which was 43 banks. A census approach enhances validity of the collected data by including certain information-rich cases for study (Saunders, Lewis & Thornhill, 2009).

3.7 Data Collection Instrument

This study used both primary data and secondary data sources. Data on EC was collected through website analysis of each commercial bank. Five web developers were trained to code EC according to the coding procedure. They performed a detailed content analysis and examined each commercial bank website filling out a standard data form on a five-point likert scale as adopted from Zhu (2004). Data on performance was extracted from

banks financial statements and bank supervision reports for the period 2016/2017. Data on moderating variable was collected from bank supervision reports while data on mediating variable was collected from customer satisfaction surveys from banks' websites.

3.7.1 Operationalization and Measurement of Study Variables

The various study variables, their operational definitions and the measurement scales used to estimate the variables. The measures have been validated by other researchers hence, this study adopted them. The operationalization and measurements are presents in Table 3.2.

Table 3.2: Operationalization and Measurement of Study Variable

Variable	Operationalization	Indicator	Measurement Scale
Performance	Firm's ability to make profits on its assets and provide returns to its investors	$ROA = \frac{\text{Net Income}}{\text{Total Assets}} * 100$	Ratio
		$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}} * 100$	Ratio
E-commerce Capability	Firms' ability to provide information, facilitate transactions, offer customized services, and integrate the back end.	Information Capability	Ratio
		Transaction Capability	Ratio
		Customization Capability	Ratio
		Back-end Integration Capability	Ratio
Business Operating Environment	Variables outside the firm that influence its business activities.	Number of CBK Regulations	Ratio
Competitive Advantage	A strategic advantage one firm has over other firms within the same.	Customer Satisfaction Index	Ratio

Source: Researcher (2017)

3.7.2 Validity of the Data Collection Instrument

According to Cooper and Schindler (2006), validity is the degree to which a set of measured items actually reflect the theoretical underlying construct the items are purported to measure. Content validity has been ensured through use of subject experts while construct validity has been achieved by conducting a thorough literature review.

3.7.3 Reliability of the Data Collection Instrument

Reliability is the ability of a measure to yield consistent results when the same objects are measured under different settings (Field, 2013). According to Hair, Celsi, Ortinau and Bush (2013), the most commonly used measure of reliability is the Cronbach's alpha. The reliability of the research instruments was tested using Cronbach Alpha's reliability coefficient. The higher the alpha, the higher the consistency, hence higher reliability. By the rule of the thumb, $\alpha \geq 0.7$ indicates adequate reliability. Consequently, the researcher will consider alpha value greater than 0.7 as the threshold for determining reliability.

3.8 Data Collection Procedure

The researcher obtained a letter of transmittal from Kenyatta University Graduate School. This letter was forwarded to the National Commission for Science, Technology and Innovation (NACOSTI) to allow use of data from the websites of the CBK and commercial

banks. Cross-sectional data was obtained from analysis of commercial banks websites and CBK and bank supervision reports by CBK and summarized by use of document review guide.as indicated in appendices 1(a) and 1(b). The data was gathered for the financial year 2016/2017. The data extraction period was between March 2018 and May 2018.

3.9 Data Analysis and Presentation

Data analysis was carried out with the help of Stata 13 and SPSS version 22.0 software with an objective of generating tables, graphs and statistical parameter estimates. The study adopted descriptive statistics and multiple regression for data analysis. Descriptive statistics was employed to summarize commercial banks EC, Business Operating Environment and CA. Multiple regression analysis was conducted to test the nature of the relationship between e-commerce capability and performance of commercial banks in Kenya.

The four dimensions of e-commerce capability; information, transaction, customization and back-end integration were compressed to form the index of e-commerce capability as recommended by Zhu (2004). Firm performance was measured using ROA and ROE. Business operating environment was measure using the number of CBK regulations complied with while CA was measured using customer satisfaction index (Nguyen, 2012). However, before testing the hypotheses, diagnostic tests such as normality, linearity,

heteroskedasticity and multicollinearity were carried out to ensure non violation of the assumptions of Classical Linear Regression Model.

3.10 Diagnostic Tests

Testing of the assumptions of the Classical Linear Regression Model (CLRM) is crucial for researchers. This is because when the assumptions of the classical linear regression model are violated, result estimates produced that are biased, inefficient, inconsistent, unreliable confidence intervals and significance tests (Chatterjee & Hadi, 2015). To deal with this problem, this study conducted several diagnostic tests such as normality, multicollinearity, heteroskedasticity and linearity to find out the suitability of the data for making inferences and drawing conclusions.

3.10.1 Test of Normality

A normality test is set to establish whether a data set is normally distributed (Hair *et al*, 2008). Non normality in a data set can result to invalid statistical results. Normality was tested using the Shapiro-Wilk test which has power to detect deviations from normality due to either skewness or kurtosis or both. Shapiro-Wilk test scores range from zero to one and values higher than critical value of 0.05 indicate that data is normally distributed (Razali & Wah, 2011). Shapiro-Wilk test measures whether data is normally distributed against null hypothesis (H_0) that the sample does not follow normal distribution.

3.10.2 Linearity

Linearity refers to the point at which a dependent variable has a linear relationship with one or more independent variables (Hair et *al*, 2008). This means that the expected value of dependent variable is a straight-line function of each independent variable, holding the others constant. To test linearity, a scatter plot for the linear and nonlinear components of any pair of variables was computed using the SPSS version 22.0. Scatter plot showing an upward sloping relationship indicates linearity; otherwise it indicates nonlinearity. Linearity suggests a strong positive linear relationship between the independent variable and the dependent variable.

3.10.3 Heteroskedasticity

Heteroskedasticity is a phenomenon that is common in cross-sectional data and it happens when the variance of the disturbance term is no longer equal. Given the data is cross-sectional, there will always be a potential for heteroskedasticity. The presence of heteroskedasticity was tested using Levene's test of homogeneity of variances. If the test is not significant (calculated probability value $\geq .05$), the two variances are not significantly different and thus, approximately equal (Gastwirth, Gel & Miao, 2009).

3.10.4 Test of Multicollinearity

Multicollinearity is a phenomenon where there is inter-correlation among the independent variables (Hair et al, 2008). According to Cooper and Schindler (2006), failure to test for perfect multicollinearity results into indeterminate regression coefficients and infinite standard errors while existence of imperfect multicollinearity results into large standard errors. This study carried out a test for multicollinearity by computing the variance inflation factors (VIF) and its reciprocal, the tolerance. VIF value greater than 10 are a sign of severe multicollinearity or tolerance while a value less than 1 indicates presence of multicollinearity among the explanatory variable.

3.10.4 Test of Correlation

Correlation is a bivariate analysis that measures the association among variables and the direction of their relationship (Razali & Wah, 2011). On the basis of the strength of relationship, the value of the correlation coefficient lies between +1 and -1. A value of ± 1 indicates a strong degree of association between the variables. As the correlation coefficient value goes towards 0, the relationship between the two variables becomes weaker. The study used Pearson's correlation coefficient to test for correlation. As recommended by Field, (2013).

Table 3.3: Summary of Data Analysis Techniques

S/N o.	Objective	Hypothesis	Statistical Approach	Threshold for interpretation
1	Establish the effect of e-commerce information capability and performance of commercial banks in Kenya.	H ₀₁ : E-commerce information capability has no significant effect on performance of commercial banks in Kenya.	Multiple regression analysis $ROA_i = \beta_0 + \beta_1 IC_i + \beta_2 TC_i + \beta_3 CC_i + \beta_4 BC_i + \varepsilon_i$	t Value, P ≤ 0.05
2	Analyze the influence of e-commerce transaction capability and performance of commercial banks in Kenya.	H ₀₂ : E-commerce transaction capability has no significant effect on performance of commercial banks in Kenya.	$ROE_i = \beta_0 + \beta_1 IC_i + \beta_2 TC_i + \beta_3 CC_i + \beta_4 BC_i + \varepsilon_i$	
3	Assess the role of e-commerce customization capability and performance of commercial banks in Kenya.	H ₀₃ : E-commerce customization capability has no significant effect on performance of commercial banks in Kenya.		
4	Analyze the effect of e-commerce back-end integration capability and performance of commercial banks in Kenya.	H ₀₄ : E-commerce back-end integration capability has no significant effect on performance of commercial banks in Kenya.		
5	Establish the moderation effect of external business environment on the	H ₀₅ : Business environment has no moderating effect on the relationship between e-commerce capability and	Regression analysis $ROA_i = \beta_0 + \beta_1 EC_i + \beta_2 BE_i$	P ≤ 0.05

	relationship between e-commerce capability and performance of commercial banks in Kenya.	performance of commercial banks in Kenya.	$+\beta_3BE.EC_i + \varepsilon_i$ $ROE_i = \beta_0 + \beta_1 EC_i + \beta_2 BE_i + \beta_3 BE.EC_i + \varepsilon_i$	Change in β
6	Determine the mediation effect of Competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya..	H ₀₆ : Competitive Advantage has no moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.	Regression analysis $ROA_i = \beta_0 + \beta_1 EC_i + \varepsilon_i$ $ROE_i = \beta_0 + \beta_1 EC_i + \varepsilon_i$ $CA_i = \beta_0 + \beta_1 EC_{it} + \varepsilon_{it}$ $ROA_i = \beta_0 + \beta_1 EC_i + \beta_2 CA_i + \varepsilon$ $ROA_i = \beta_0 + \beta_1 EC_i + \beta_2 CA_i + \varepsilon$	P ≤ 0.05 Change in β

Source: Researcher (2017)

3.11 Ethical Issues

According to Saunders, Lewis and Thornhill (2007), ethics comprises the standards of behavior that guide researchers' moral choices about their behavior and relationships with other individuals or organizations. The researcher acknowledges the importance of ethical standards such as confidentiality, privacy and informed consent while conducting the study. To address ethical concerns, collected data was kept private and confidential and was only used for academic research. A letter of transmittal was sought from the university while a research permit was obtained for the NACOSTI to allow use of secondary data from CBK and commercial banks' websites.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and discussions. Chapter Four major subsection which include descriptive research findings, diagnostics tests results, inferential statistics and finally summary of the hypotheses tested. Under descriptive statistics the study used percentages, mean and standard deviation. In inferential statistics the study employed regression analysis to the effect of independent variable on dependent variable.

4.2 Reliability Test Results

In this study, Cronbach's Alpha, which is a reliability coefficient, was applied to indicate how well the items in the set correlated. According to Sijtsma (2009), a Cronbach's Alpha of 0.70 or higher indicates that the gathered data is reliable as it has a relatively high internal consistency; it can be generalized to reflect opinions of all respondents in the target population Sijtsma (2009), Table 4.7 presents the reliability test results.

Table 4.1 Summary of the Scale Reliability Results

	N of Items	Cronbach's Alpha	Conclusion
Information Capability	3	0.913	Accepted
Transaction Capability	3	0.936	Accepted
Customization Capability	3	0.912	Accepted
Back-End Integration Capability	3	0.863	Accepted

Source: Pilot Test Data (2018)

The reliability test results shown in Table 4.1 reveals that the scales for all the independent and dependent variable were reliable as they surpassed the minimum Cronbach's Alpha value threshold of 0.7 recommended by Field (2013). Accordingly, none of the items in the website content analysis tool were deleted after the pilot study. The tool was adequate to be used in the final survey.

4.3 Descriptive Statistical Analysis

This section presents descriptive analysis for independent variables, dependent variable, moderating variable and finally mediating variable. Websites analysis was conducted to establish the level of e-commerce capability using the scale of very unsatisfactory to very satisfactory.

4.3.1 Information Capability

Information capability in this study was measured using three aspects: availability of product information, search capability and product review capability. The descriptive findings on information capability are presented in Table 4.2.

Table 4.2: Descriptive Results for Information Capability

		Very Unsatisfactory	Unsatisfactory	Moderately Satisfactory	Satisfactory	Very Satisfactory	Mean	Strd Dev
Sector	Product Information	0.0%	5.0%	52.5%	17.5%	25.0%	4	0.93
	Search Capability	0.0%	27.5%	30.0%	25.0%	17.5%	3	1.07
	Product Review	0.0%	25.0%	32.5%	27.5%	15.0%	3	1.02
Tier 1 Banks	Product Information	0.0%	0.0%	0.0%	14.3%	85.7%	5	0.38
	Search Capability	0.0%	0.0%	0.0%	42.9%	57.1%	5	0.53
	Product Review	0.0%	0.0%	0.0%	71.4%	28.6%	4	0.49
Tier 2 Banks	Product Information	0.0%	16.7%	16.7%	33.3%	33.3%	4	1.11
	Search Capability	0.0%	16.7%	16.7%	41.7%	25.0%	4	1.06
	Product Review	0.0%	25.0%	8.3%	41.7%	25.0%	4	1.15
Tier 3 Banks	Product Information	0.0%	0.0%	90.5%	9.5%	0.0%	3	0.30
	Search Capability	0.0%	42.9%	47.6%	9.5%	0.0%	3	0.66
	Product Review	0.0%	33.3%	57.1%	4.8%	4.8%	3	0.75

Source: Study Data (2018)

Table 4.2 indicated that 25.0% of the commercial banks in Kenya had very satisfactory product information in their websites; 17.5% had satisfactory while more than half (52.5%) had moderately satisfactory product information. The results further point out that 85.7% and 14.3% of Tier 1 commercial banks had very satisfactory and satisfactory content on product information respectively. For Tier 2 commercial banks, 33.3% had both very satisfactory and satisfactory content on product information respectively. Majority (90.5%) of Tier 3 had moderate content on product information in their websites.

Analysis of search capability reveals that for the entire sector, 17.5% had very satisfactory search capability, 25.0% had satisfactory search capability, and 30.0% had moderately satisfactory search capability while 27.5% had unsatisfactory search capability. The results indicate that none of the commercial banks had very unsatisfactory search capability in their websites. For Tier 1 commercial banks, the findings demonstrate that majority (57.1% and 42.9%) of the banks had very satisfactory and satisfactory search capability in their websites. In Tier 2, 41.7% and 25.0% of the commercial banks had very satisfactory and satisfactory search capability respectively in their websites. Majority (47.6% and 42.9%) of Tier 3 commercial banks had moderately satisfactory and unsatisfactory search capability in their websites. The findings show that majority of the Tier 1 commercial banks had satisfactory search capability on their websites.

The table also reveals that 15.0% had very satisfactory product review capability; 27.5% had satisfactory product review capability; 32.5% had moderate satisfactory product review capability and 25.0% had unsatisfactory product review capability. The mean for product review capability for the entire sector was 3, confirming that majority of the commercial banks in Kenya had moderately satisfactory product review capability.

Accordingly, all the Tier 1 commercial banks either had satisfactory product review capability (71.4%) or very satisfactory product review capability (28.6%) on their websites. The findings further reveal that 41.7% and 25.0% of Tier 2 had satisfactory and

very satisfactory product review capability on their websites. Finally, it is evident that Tier 3 commercial banks either had moderately satisfactory (57.1%) or unsatisfactory (33.3%) product review capability on their websites.

The mean for product information, search capability and product review for the entire sector was 4, 3 and 3 respectively confirming that majority of the commercial banks in Kenya had satisfactory and moderately satisfactory product information, search capability and product review. The standard deviations of 0.93 for product information, 1.07 for search capability and 1.02 for product review reveal that the webs developers generally agreed that product information, search capability and product review are crucial to information EC.

The findings of websites revealed that information capability varied from one aspect to another across various commercial banks. The study findings imply that commercial banks in Kenya had satisfactory product information compared to search capability and product review capability. The findings further point out that majority of the large commercial banks had satisfactory product information on their websites as compared to smaller commercial banks.

4.3.2 Transaction Capability

Transaction capability in this study was measured using three dimensions: payment capability, account management and web security. The websites analysis findings on the transaction capability are presented in Table 4.3.

Table 4.3: Descriptive Results for Transaction Capability

		Very Unsatisfactory	Unsatisfactory	Moderately Satisfactory	Satisfactory	Very Satisfactory	Mean	Std Dev
Sector	Payment Capability	0.0%	45.0%	12.5%	27.5%	15.0%	3	1.16
	Account Management	0.0%	30.0%	27.5%	22.5%	20.0%	3	1.12
	Web Security	0.0%	35.0%	22.5%	20.0%	22.5%	3	1.18
Tier 1 Banks	Payment Capability	0.0%	0.0%	0.0%	57.1%	42.9%	4	0.53
	Account Management	0.0%	0.0%	0.0%	71.4%	28.6%	4	0.49
	Web Security	0.0%	0.0%	0.0%	42.9%	57.1%	5	0.53
Tier 2 Banks	Payment Capability	0.0%	33.3%	0.0%	41.7%	25.0%	4	1.24
	Account Management	0.0%	8.3%	25.0%	25.0%	41.7%	4	1.04
	Web Security	0.0%	25.0%	8.3%	33.3%	33.3%	4	1.22
Tier 3 banks	Payment Capability	0.0%	66.7%	23.8%	9.5%	0.0%	2	0.68
	Account Management	0.0%	52.4%	38.1%	4.8%	4.8%	3	0.80
	Web Security	0.0%	52.4%	38.1%	4.8%	4.8%	3	0.80

Source: Study Data (2018)

Table 4.2 results reveal that in the entire sector, 45% of the banks had unsatisfactory payment capability, 12.5% moderately satisfactory, 27.5% satisfactory and 15.0% very satisfactory. The mean of 3 indicated that majority of the commercial banks had

moderately satisfactory payment capability. The mean for payment capability for Tier 1 commercial banks was 4; Tier 2 commercial banks had a mean of 4; Tier 3 had a mean of 2. The findings showed that large commercial banks and medium size commercial banks had satisfactory payment capability while small commercial banks had unsatisfactory payment capability.

The results on account management capability revealed that 30.0% had unsatisfactory account management capability, 27.5% moderately satisfactory, 22.5% satisfactory account management capability; 20.0% of the commercial banks had very satisfactory account management capability. The findings revealed that large and medium size commercial banks in Kenya had satisfactory account management capability on their websites while small commercial banks had moderately satisfactory account management capability. The findings indicated that on average, majority of the commercial banks had moderately satisfactory account management capability on their e-commerce platforms.

The study further analyzed the web security on e-commerce platforms of commercial banks in Kenya. The findings indicate that 35% of the commercial banks had unsatisfactory web security capability and 22.5%, moderately satisfactory web security capability. On the other hand, 20.0% and 22.5% had satisfactory and very satisfactory web security capability respectively. The results further reveal that large commercial banks had

very satisfactory web security capability as shown by the mean of 5. Medium size commercial banks had satisfactory web security capability while small banks had moderately satisfactory web security capability on their e-commerce platforms.

The finding also revealed that the mean aggregate scores for payment capability, account management and web security for the entire sector was 3 confirming that majority of the commercial banks in Kenya had moderately satisfactory payment capability, account management and web security. The standard deviations of 1.16 for payment capability, 1.12 for account management and 1.18 for web security, reveal that the webs developers generally agreed that payment capability, account management and web security are key to transaction EC.

These results point out that some commercial banks in Kenya especially large banks had very satisfactory web security while others had unsatisfactory web security as shown by variation in standard deviations of various transaction capability. The findings further imply that large banks had better transaction capability compared to smaller banks. Large commercial banks had adequate resources to install top security capability on their e-commerce platforms.

4.3.3 Customization Capability

Customization capability focused on online registration, online recommendations and real time support as attributes of e-commerce capability categorized as customization capability. Table 4.4 presents the findings obtained based on websites review and analysis.

Table 4.4: Descriptive Results for Customization Capability

		Very Unsatisfactory	Unsatisfactory	Moderately Satisfactory	Satisfactory	Very Satisfactory	Mean	StdDev
Sector	Online Registration	27.5%	15.0%	15.0%	32.5%	10.0%	3	1.41
	Online Recommendation	22.5%	22.5%	12.5%	22.5%	20.0%	3	1.48
	Real-time Support	15.0%	25.0%	17.5%	7.5%	35.0%	3	1.53
Tier 1 Banks	Online Registration	0.0%	0.0%	0.0%	71.4%	28.6%	4	0.49
	Online Recommendation	0.0%	0.0%	0.0%	71.4%	28.6%	4	0.49
	Real-time Support	0.0%	0.0%	0.0%	14.3%	85.7%	5	0.38
Tier 2 Banks	Online Registration	16.7%	8.3%	8.3%	66.7%	0.0%	3	1.22
	Online Recommendation	16.7%	8.3%	8.3%	16.7%	50.0%	4	1.60
	Real-time Support	0.0%	8.3%	25.0%	16.7%	50.0%	4	1.08
Tier 3 Banks	Online Registration	42.9%	23.8%	23.8%	0.0%	9.5%	2	1.26
	Online Recommendation	33.3%	38.1%	19.0%	9.5%	0.0%	2	0.97
	Real-time Support	28.6%	42.9%	19.0%	0.0%	9.5%	2	1.17

Source: Study Data (2018)

The website analysis results on online registration capability reveals that 32.5% and 10.0% had satisfactory and very satisfactory online registration capability, 15.0% had moderately satisfactory, 15.0% unsatisfactory while 27.5% had very unsatisfactory online registration

capability on their e-commerce platforms. Majority of the commercial banks with satisfactory and very satisfactory were either large commercial banks or medium sized commercial banks. Small commercial banks had unsatisfactory and very unsatisfactory online registration capability as indicated by the mean of 2.

The study further sought to establish whether commercial banks in Kenya had suitable online recommendation capability on their e-commerce platforms. Online recommendation capability had a mean of 3, implying that some commercial banks had satisfactory online recommendation capability while others had unsatisfactory online recommendation capability. The findings were confirmed by the standard deviation of 1.48 which indicated high variation in online recommendation capability among commercial banks in Kenya. However, the results for large commercial banks indicated that majority of the large banks had satisfactory online recommendation capability on their e-commerce platforms compared to medium sized banks and small banks. The findings further indicate that majority of the small banks had unsatisfactory online recommendations capability on their e-commerce platforms.

The final customization capability that the study focused on was real-time support capability. The findings indicate that 35.0% and 7.5% of the banks had very satisfactory and satisfactory real time support capability respectively while 25.0% and 15.0% of the commercial banks had unsatisfactory and very unsatisfactory real time support capability

respectively. The results further reveal that real time support capability among large commercial and medium size commercial banks was satisfactory as compared to small commercial banks whose majority had very unsatisfactory real time capability on their e-commerce platforms.

The finding further revealed that the mean aggregate scores online registration, online recommendation and real-time support for the entire sector was 3 confirming that majority of the commercial banks in Kenya had moderately satisfactory online registration, online recommendation and real-time support. The standard deviations of 1.41, 1.48 and 1.53 for online registration, online recommendation and real-time support respectively reveal that the webs developers generally agreed that online registration, online recommendation and real-time support are key to customization EC.

Similar to other EC, the study findings on customization capability implied that it varied across commercial banks. Some commercial banks in Kenya had very satisfactory customization capability while others had very unsatisfactory customization capability. Large banks similarly had better customization capability on their e-commerce platforms compared to medium size and small banks. This was justified on availability of better resources in large banks and the need to handle large customers base by encouraging hall banking and e-banking.

4.3.4 Back-End Capability

Back-end capability that the study focused on include EDI links, virtual community and data sharing. Table 4.4 presents the descriptive results on suitability of back-end capability among the commercial banks.

Table 4.5: Descriptive Results for Back-End Capability

		Very Unsatisfactory	Unsatisfactory	Moderately Satisfactory	Satisfactory	Very Satisfactory	Mean	Std Dev
Sector	EDI Links	20.0%	12.5%	25.0%	27.5%	15.0%	3	1.36
	Virtual Community	17.5%	17.5%	22.5%	27.5%	15.0%	3	1.34
	Data Sharing	15.0%	17.5%	25.0%	20.0%	22.5%	3	1.38
Tier 1 Banks	EDI Links	0.0%	0.0%	0.0%	85.7%	14.3%	4	0.38
	Virtual Community	0.0%	0.0%	0.0%	57.1%	42.9%	4	0.53
	Data Sharing	0.0%	0.0%	0.0%	42.9%	57.1%	5	0.53
Tier 2 Banks	EDI Links	25.0%	0.0%	8.3%	41.7%	25.0%	3	1.56
	Virtual Community	0.0%	8.3%	25.0%	50.0%	16.7%	4	0.87
	Data Sharing	8.3%	25.0%	0.0%	25.0%	41.7%	4	1.50
Tier 3 Banks	EDI Links	23.8%	23.8%	42.9%	0.0%	9.5%	2	1.17
	Virtual Community	33.3%	28.6%	28.6%	4.8%	4.8%	2	1.12
	Data Sharing	23.8%	19.0%	47.6%	9.5%	0.0%	2	0.98

Source: Study Data (2018)

The findings presented in Table 45 implied EDI links had a mean of 3 which implied that majority of the commercial banks in Kenya had moderately satisfactory EDI links. Only large banks were found to have satisfactory EDI links; medium as well as small banks had moderately satisfactory and unsatisfactory EDI links respectively.

The study further sought to establish if commercial banks in Kenya had virtual community capability in their e-commerce platforms. The findings reveal that 17.5% recorded very unsatisfactory, 17.5% unsatisfactory, 22.5% moderately satisfactory, 27.5% satisfactory and 15.0% very satisfactory virtual community capability in their e-commerce platforms. Similarly, the results meant that large commercial banks and medium size commercial banks had satisfactory virtual community capability in their e-commerce platforms as compared to small commercial banks.

Data sharing capability findings reveal that 15.0% of the banks had very unsatisfactory data sharing capability, 17.5% unsatisfactory data sharing capability, 25.0% moderate satisfactory data sharing capability while 20.0% and 22.5% had satisfactory and very satisfactory data sharing capability respectively. Majority of the commercial banks with satisfactory data sharing capability were Tier 1 banks while majority of Tier 3 had very unsatisfactory data sharing capability.

The finding also indicate that the mean aggregate scores for EDI links, virtual community and data sharing for the entire sector was 3 revealing that majority of the commercial banks in Kenya had moderately satisfactory EDI links, virtual community and data sharing. The standard deviations of 1.36 for EDI links, 1.34 virtual community and 1.38

data sharing, confirm that the webs developers generally agreed that EDI links, virtual community and data sharing are essential to back-end integration EC.

Generally, the findings imply that majority of the commercial banks in Kenya had moderately satisfactory back-end capability content in their e-commerce platforms. However, there are banks with high end back-end capability while others had very unsatisfactory capability.

4.3.5 Business Operating Environment

This section presents the descriptive results on business operating environment which was measured using regulatory framework. The study collected secondary data on the number of CBK prudential regulation commercial banks had complied with (Appendix V). The findings are presented in Figure 4.1 shown.

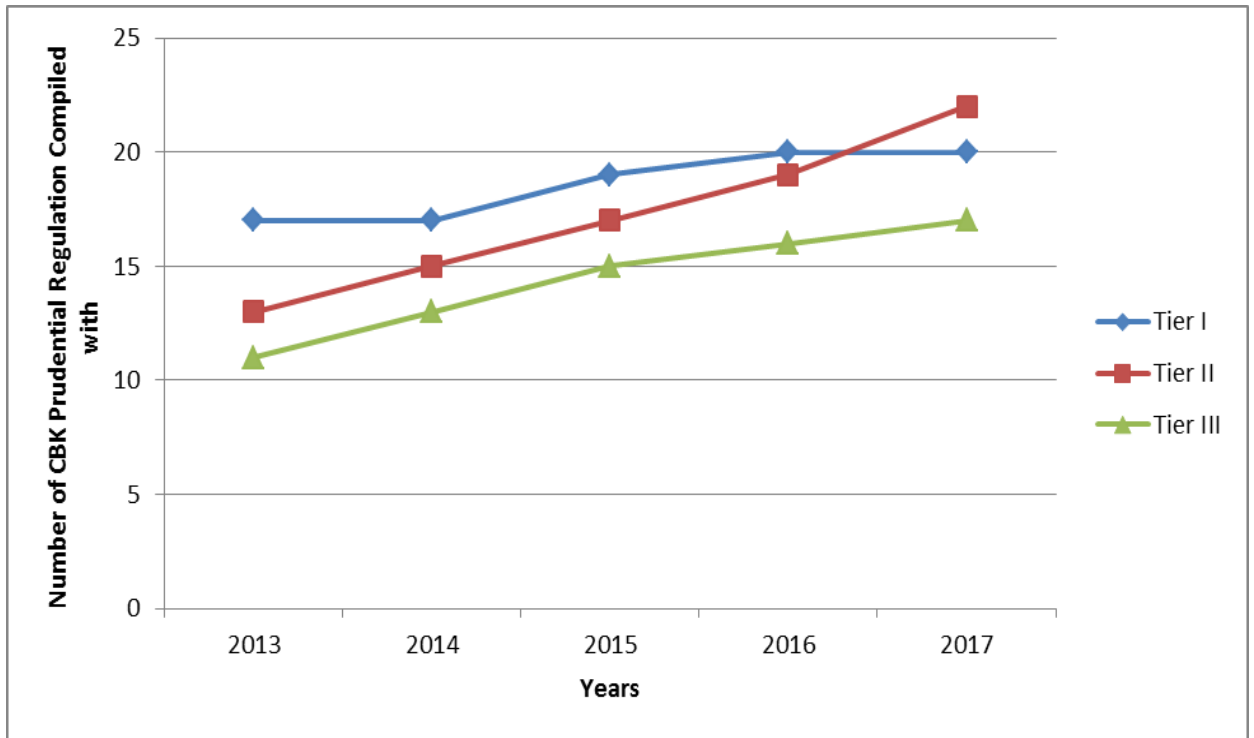


Figure 4.1 Business Operating Environment

Source: Study Data (2018)

Figure 4.1 shows that the level of compliance with the CBK regulation increased between 2014 and 2018. The results further imply that CBK increased the number of prudential regulations to adhere to international standards. These include those ingrained in the Basel III regulations required to improve the supervision and risk management within the banking sector.

According to Berlin (2015), Basel III regulations require banks to hold a capital conservation buffer of 2.5% on top of Tier 1 capital to withstand future periods of stress,

bringing the total common equity requirements to 7%. The purpose of the conservation buffer is to ensure that banks maintain a buffer of capital that can be used to absorb losses during periods of financial and economic stress. Introduction of new regulation affects the operations of commercial banks. This is because they need to readjust their operations to adhere to the additional regulation hence profitability of the commercial banks may be affected.

4.3.6 Competitive Advantage

In this study, CA was used as a mediating variable and was measured using customer satisfaction index. Figure 4.2 presents the findings on the level of customer satisfaction as reflected by the reports of the analyzed commercial banks.

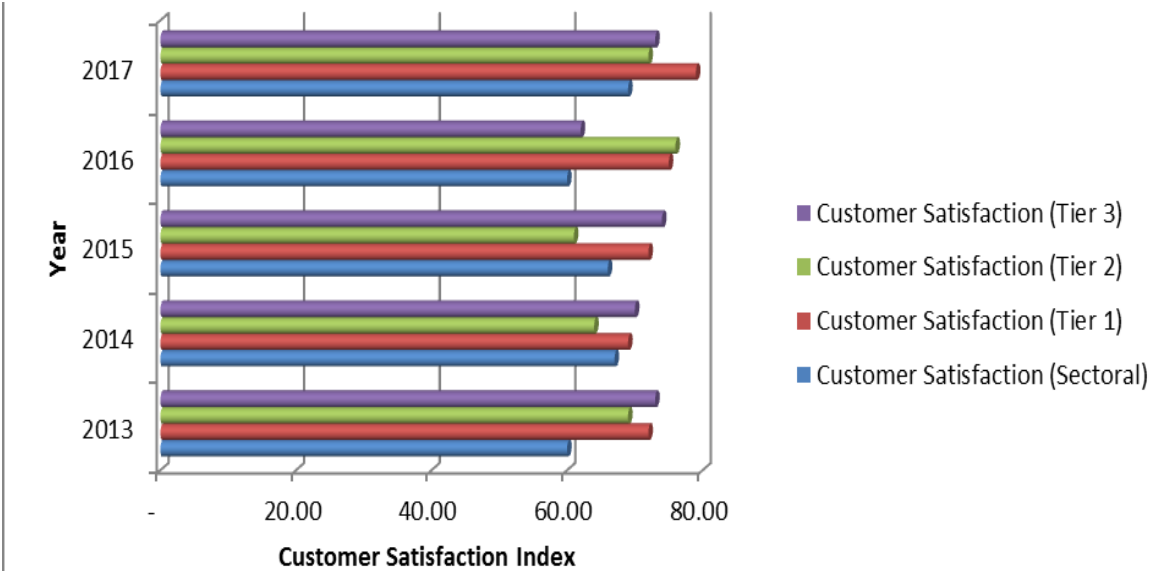


Figure 4.2 Customer Satisfaction Index

Source: Study Data (2018)

The study analysed the customer satisfaction index of the commercial banks as a measure of CA. The findings presented in Figure 4.2 indicate that the overall customer satisfaction index for 2017, 2015 and 2014 was above the average index of 60%. The results further show that the customer satisfaction index of Tier 1 banks was slightly above Tier 2 and Tier 3 commercial banks. The findings implied that larger banks had a competitive edge over small banks. Mugo (2012), also reported that large banks had a lot of resources. They also invested heavily in technological products, processes and institutional changes, training programmes and employee empowerment practices to enhance their CA.

4.4 Inferential Statistics

This section presents results of inferential statistics specifically multivariate regression analysis. Inferential statistics in this study were necessary to establish the nature, direction, magnitude and significance of the relationship between independent variables and dependent variable. In this study, it was the basis for hypothesis testing since they provided the significance of the relationship between e-capabilities and performance of commercial banks in Kenya.

4.4.1 Diagnostic Tests

This section presents the findings of diagnostic tests conducted to ensure that data used was suitable for regression analysis. Testing regression assumptions ensures that the results obtained are not spurious but adequate to make conclusions about the study population.

Tests conducted by the study include normality test, linearity tests, heteroskedasticity and multicollinearity.

4.4.1.1 Normality Test Results

Normality was tested using the Shapiro-Wilk test which has power to detect deviations from normality due to either skewness or kurtosis or both. Shapiro-Wilk test scores range from zero to one and values higher than critical value of 0.05 indicate that data is normally distributed (Razali & Wah, 2011). Shapiro-Wilk test measures whether data is normally distributed against null hypothesis (H_0) that the sample does not follow normal distribution. The findings of normality test are presented in Table 4.6.

Table 4.6: Normality Test Results

Tests of Normality	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Information Capability	0.911	38	0.210	0.895	38	0.202
Transaction Capability	0.976	38	0.405	0.907	38	0.404
Customization Capability	0.911	38	0.102	0.833	38	0.112
Backend Integration Capability	0.920	38	0.880	0.845	38	0.089
Competitive Advantage	0.997	38	0.067	0.824	38	0.060
Business Operating Environment	0.864	38	0.065	0.780	38	0.067
ROE	0.842	38	0.051	0.942	38	0.054
ROA	0.904	38	0.077	0.916	38	0.078

Source: Study Data (2018)

The study results show that the null hypothesis that data does not follow a normal distribution was rejected since the p -values for all the variables was greater than the critical $p =$ value of 0.05. These findings led to the conclusion that data for all the variables was normally distributed hence adequate for further analysis to establish the effect of

independent variables on dependent variable. This findings are supported by Ghasemin and Zahediasi (2012) who argued that the variables are supposed to be roughly normally distributed especially if the results are to be generalized beyond the sample.

4.4.1.2 Linearity Test Results

To show the kind of a linear relationship that existed between the independent variable EC and the dependent variable performance of commercial banks in Kenya, a scatter plot was generated. From figures 4.2 and 4.3, the scatter plot shows an upward sloping relationship for both the relationship between e-commerce and ROE as well as e-commerce and ROA.

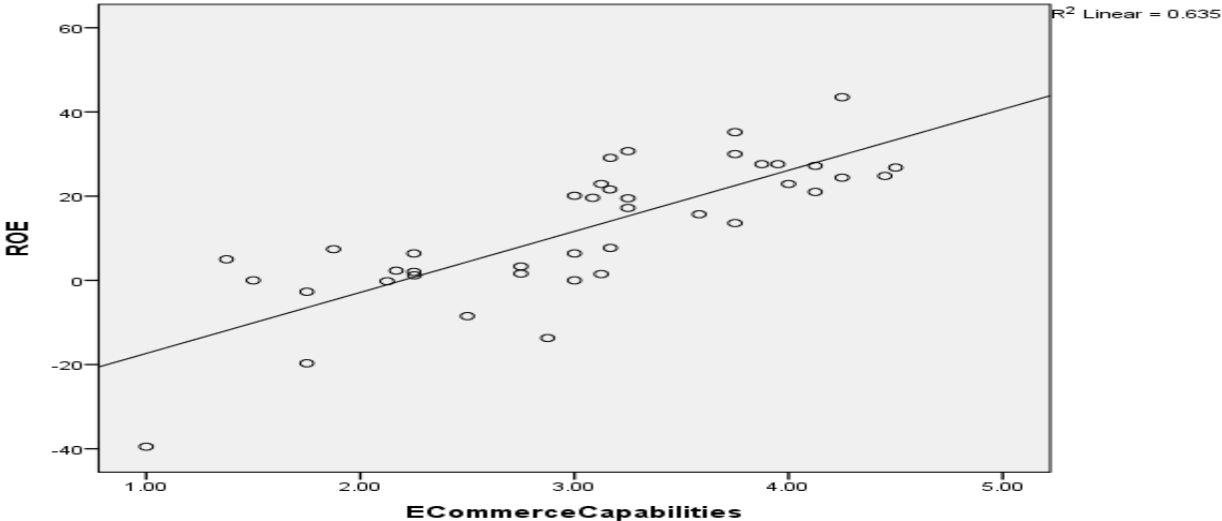


Figure 4.3: Linearity Testing for ROE and EC

Source: Study Data (2018)

Figure 4.3 presents the linearity tests results for EC and ROE for commercial banks in Kenya. The findings reveal that there exists a linearity relationship between e-commerce capability and ROE. The results indicate that the data adheres to the linearity assumption of regression modeling. According to Neter, Kutner, Nachtsheim and Wasserman (1996), any data that is subjected to linear regression must adhere to linearity assumption. Accordingly, on this assertion, the study employed the linear regression analysis to test the relationship between e-commerce capability and performance of commercial banks in Kenya.

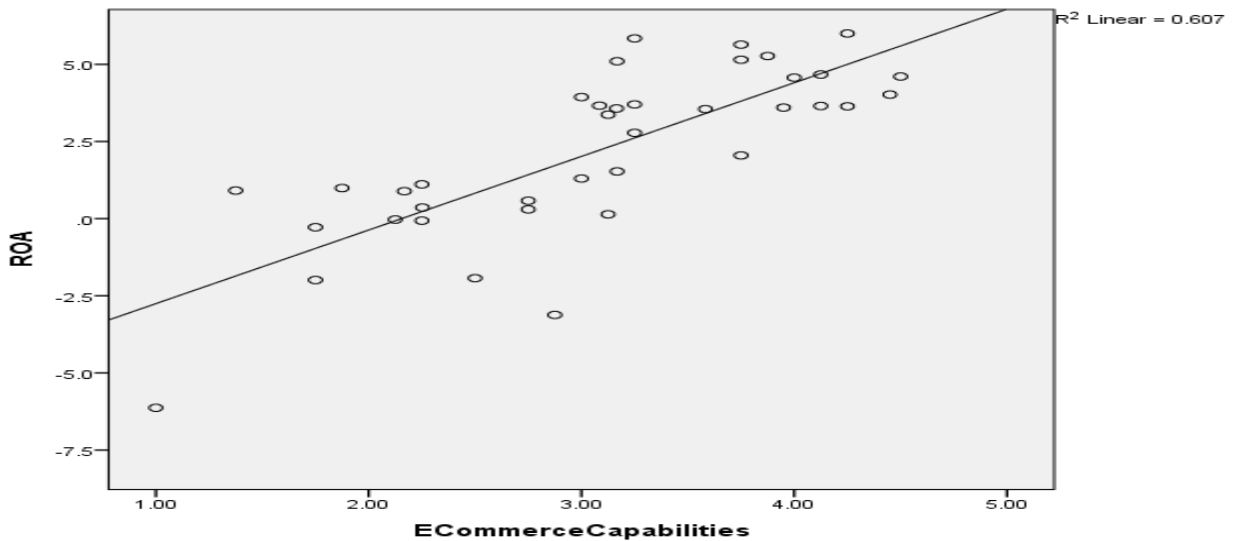


Figure 4.4: Linearity Testing for ROA and EC

Source: Study Data (2018)

Figure 4.4 presents the linearity tests results for EC and ROA for commercial banks in Kenya. The findings similarly reveal that there exists a linearity relationship between e-commerce capability and ROA. The results also indicate the data adheres to the linearity assumption of regression modeling (Netter, Kutner, Nachtsheim and Wasserman, 1996).

4.4.1.3 Heteroskedasticity Test Results

The presence of heteroskedasticity was tested using Levene’s test of homogeneity of variances. If the test is not significant (calculated probability value $\geq .05$), the two variances are not significantly different and thus approximately equal (Gastwirth, Gel & Miao, 2009). The null hypothesis was that the error term was homoscedastic. The alternative hypothesis was that the error term was heteroskedastic. If the null hypothesis was rejected, then it implied that heteroscedasticity was present.

Table 4.7: Heteroskedasticity Test Results

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
ROE	3.055	2	35	.060
ROA	3.047	2	35	.063

Source: Study Data (2018)

Table 4.7, indicates that the levene statistic is 3.055 (p-value = 0.060) for ROE; levene statistic is 3.047 (p-value = 0.063) for ROE. Since the test–statistic is small with the p-value greater than 0.05, the null hypothesis was accepted and concluded that there was

homoscedasticity in the data (that is, the data is not heterogeneous in variance). This satisfies the assumption of regression. A test for homoscedasticity is made to test for variance in residuals in the regression model used. If there exists equal variance of the error term, we have a normal distribution.

Vynck (2017) cautions against ignoring the presence of this heteroscedasticity by fitting ordinary least squares regression models, a method that assumes homoscedasticity. It can only result in inefficient regression parameter estimators and a biased and inconsistent covariance matrix estimator. This ultimately leads to wrongful inference and potential faulty conclusions. Because heteroscedasticity is prevalent in many datasets, there is dire need for methods that still have desirable properties when the homoscedasticity assumption is violated.

4.4.1.4 Multicollinearity Test Results

This study carried out a test for multicollinearity by computing the variance inflation factors (VIF) and its reciprocal, the tolerance. VIF value greater than 10 are a sign of multicollinearity; tolerance value of less than 1 indicates presence of multicollinearity among the explanatory variables.

Table 4.8 (a): Multicollinearity Test Results

Collinearity Statistics

Variable	Tolerance	VIF
Information Capability	0.483	2.071
Transaction Capability	0.475	2.104
Customization Capability	0.369	2.712
Backend Integration Capability	0.422	2.371
Competitive Advantage	0.706	1.417
Business Operating Environment	0.474	2.108

a Dependent Variable: **ROE**

Source: Study Data (2018)

The findings presented in Table 4.8 (a) reveal that information capability had a VIF of 2.071. Transaction capability had a VIF of 2.104; customization capability had a VIF of 2.712; back-end integration capability had a VIF of 2.371; Competitive Advantage had a VIF of 1.417 and Business Operating Environment had a VIF of 2.108. These results indicate that the VIF values of the variables were within the threshold of 5. This indicated that there was no significant threat of multicollinearity. Therefore, the study could include all the variables in linear regression analysis. This was because there was no independent variable with a strong linear relationship with any other independent variable(s). According to Poole and O'Farrell (1971), if multicollinearity assumption is not satisfied and the independent variables are thus multicollinear, the result is that the individual regression coefficients for each variable are not identifiable. Indeed, the closer the linear correlation between the independent variables, the less the certainty with which these coefficients may be identified. This imprecision in the estimate of the regression coefficients is generally revealed by the occurrence of high standard errors.

Table 4.8(b): Multicollinearity Test Results

	Collinearity Statistics	
	Tolerance	VIF
Information Capability	0.766	1.306
Transactional Capacity	0.737	1.356
Customization Capacity	0.793	1.260
Backend Integration	0.660	1.516
Business Operating Environment	0.857	1.166
Competitive Advantage	0.711	1.406

a Dependent Variable: **ROA**

Source: Study Data (2018)

The findings presented in Table 4.8 (b) indicate that information capability had a VIF of 1.306; transaction capability had a VIF of 1.356. Customization capability had a VIF of 1.260; back-end integration capability had a VIF of 1.516. Competitive Advantage had a VIF of 1.166 and Business Operating Environment, a VIF of 1.406. These results indicated that the VIF values of the variables were within the threshold of 5. This indicate that there was no significant threat of multicollinearity. As such, the study could include all the variables in linear regression analysis. The reason for this was that there was no independent variable with a strong linear relationship with any other independent variable(s).

4.4.1.5 Correlation Analysis

Correlation analysis was used to determine the strength of the association between e-commerce capability and indicators of performance of commercial banks in Kenya as shown in Table 4.9.

Table 4.9: Correlation Matrix

	Information Capability	Transaction Capacity	Customization Capacity	Backend Integration	Competitive Advantage	Business Operating Environment	ROE	ROA
Information Capability	1							
Transaction Capacity	0.298	1						
Customization Capacity	0.091	0.033	1					
Back-end Integration	.347*	0.289	.331*	1				
Competitive Advantage	0.178	.384*	0.264	.368*	1			
Business Operating Environment	0.055	0.01	0.304	0.246	-0.01	1		
ROE	.569**	.396*	.410**	.688**	.672**	0.231	1	
ROA	.535**	.369*	.460*	.709**	.651**	0.258	.983*	1
N	38	38	38	38	38	38	38	38

* Correlation is significant at the 0.05 level (2-tailed).

Source: Study Data (2018)

Table 4.9 reveals that information capability had a strong positive association with both ROE and ROA of performance of commercial banks in Kenya. This is shown by $r=0.569$ and $r=0.535$. The correlations were significant at the level of significance of 0.05. The results implied that increasing information capability would increase the performance of commercial banks in Kenya. This study finding concurs with Lederer, Mirchandani and Sims (2001) who found out that firms that used the internet to publish products and services information achieve flexibility, customer retention and improved performance.

Similarly, the study finding concurs with Zhu (2004) who established that firms that used e-commerce were enabled to access new markets, create new distribution channels and attract potential and new customers. Merono-Cerdan and Soto-Acosta (2007) also observed that there was a relationship between firm EC: information and customization capability strongly support the positive performance of a firm.

The findings further revealed that transaction capability had a weak and positive association with both ROE and ROA of commercial banks in Kenya as shown by $r=0.396$ and $r=0.369$. The correlation was also significant at the level of significance of 0.05. Hence, if the commercial increases transaction capability in their e-commerce platforms, it would lead to increase in performance as measured by ROE and ROA. The study finding agrees with Croom (2000) whose study results further show that improved processing ability can be attained by using e-commerce to cut down on expenses.

DaSilveira (2003) on the other hand, found out that e-commerce transaction capability such as the ability to conduct online transactions. These include buying, online payment and provision of web security to minimize operational costs and lead to profitability. Customization capability was also found to have a weak and positive association with both ROE and ROA of commercial banks in Kenya as shown by $r=0.410$ and $r=0.460$. Introduction of customization capability would lead to increase in performance. Kiron,

Prentice and Ferguson (2012) study findings also revealed customization capability and transaction capability leads to improved performance.

Back-end integration was finally found to have a strong and positive association with both ROE and ROA of commercial banks in Kenya. The table is also as shown by $r=0.688$ and $r=0.709$; the correlation was established to be significant at both 0.05 and 0.01. If commercial banks in Kenya enhance back-end integration, they would improve their performance. The study results agrees with Zhu (2004) who found that there exists a positive relationship between e-commerce, back-end integration and firm performance.

The results establish that Competitive Advantage. Business Operating Environment had positive association with both ROE and ROA of commercial banks in Kenya. The finding concurs with Delis, Molyneux and Pasiouras (2011) who found out that bank regulations and incentives that stimulate private monitoring and restrictions on banks' operations had a positive effect on efficiency. Aranyossy (2010) also found that CA influenced performance of firms.

4.4.2 Hypotheses Testing

This section presents the the results of hypotheses testing as they were depicted in chapter two. Hypotheses H_{01} , H_{02} , H_{03} and H_{04} were based on EC dimensions. To test the effect of

E-commerce capability on performance, the study employed multivariate regression analysis. Hypotheses testing were done based on the findings of multivariate regression analysis. The study conducted two multivariate regression analyses to link e-commerce capability with both ROE and ROA respectively at 95 percent confidence level ($\alpha=0.05$). The results on the two fitted models are presented in tables 4.10 to 4.12.

Table 4.10: Model Summary for ROE and ROA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
ROE	0.812	0.66	0.621	10.121
ROA	0.794	0.631	0.586	1.756

a. Predictors: (Constant), Backend Integration , Transaction Capacity, Customization Capacity, Information Capability

Source: Study Data (2018)

The results revealed Adjusted R=squared = 0.621 for ROE and R=squared = 0.586 for ROA. These findings implied that e-commerce capability (back-end integration, transaction capacity, and customization capacity and information capability) accounted for 62.1% of the change in ROE and 58.6% of the change in ROA of commercial banks in Kenya. The results further imply that EC had a high explanatory power on performance of commercial banks.

Table 4.11: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
ROE	Regression	6946.352	4	1736.588	16.953	0.000
	Residual	3585.282	33	102.437		
	Total	10531.63	37			

ROA	Regression	173.783	4	43.446	14.088	0.000
	Residual	101.766	33	3.084		
	Total	275.549	37			

b Predictors: (Constant), Backend Integration, Transaction Capacity, Customization Capacity, Information Capability

Source: Study Data (2018)

The findings of ANOVA revealed F-statistics =16.953 p-value = 0.000 and F=14.088, p=0.000 which was less than a significance level of 0.05 for the model linking EC and performance of commercial banks in Kenya. The finding implies that the model was statistically significant. Based on these findings, the study rejected the null hypothesis that EC does not have a significant effect on performance of commercial banks in Kenya. The study finding concurs with Zhu (2004) who established that firms that use e-commerce are enabled to access new markets, create new distribution channels and attract potential and new customers.

Table 4.12: Regression Coefficients Results

		B	Std. Error	Beta	t	Sig.
ROE	(Constant)	28.633	6.102		4.693	0.000
	Information Capability	4.290	1.334	0.347	3.216	0.003
	Transaction Capacity	1.926	1.307	0.156	1.473	0.150
	Customization Capacity	2.773	1.29	0.225	2.151	0.038
	Backend Integration	4.833	1.226	0.448	3.941	0.000
ROA	(Constant)	4.551	1.121		4.059	0.000
	Information Capability	0.610	0.247	0.296	2.476	0.019
	Transaction Capacity	0.332	0.242	0.156	1.375	0.178
	Customization Capacity	0.481	0.23	0.236	2.093	0.044
	Backend Integration	0.827	0.22	0.462	3.763	0.001

Source: Study Data (2018)

Based on the analysis in Table 4.12, the following models were formulated.

$$\text{ROE} = 28.633 + 4.290 (\text{Information Capability}) + 1.926 (\text{Transaction Capability}) + 2.773 (\text{Customization Capability}) + 4.833 (\text{Back-end Integration Capability}) + \varepsilon_i$$

$$\text{ROA} = 4.551 + 0.610 (\text{Information Capability}) + 0.332 (\text{Transaction Capability}) + 0.481 (\text{Customization Capability}) + 0.827 (\text{Back-end Integration Capability}) + \varepsilon_i$$

H₀₁: Information Capability has no Significant Effect on Performance of Commercial Banks in Kenya

H_{01a}: Information capability has no significant effect on return on equity of commercial banks in Kenya.

Hypothesis one part (a) of the study sought to establish the effect of information capability on ROE of commercial banks in Kenya. In the model linking ROE and CE, Information Capability had a beta coefficient of 4.290 with a corresponding p-value 0.003 meaning Information Capability had a significant positive effect on ROE.

H_{01b}: Information capability has no significant effect on return on assets of commercial banks in Kenya.

Hypothesis one part (b) of the study sought to test the effect of information capability on ROA of commercial banks in Kenya. In the second model linking EC and ROA, Information capability had a beta coefficients of 0.610 with a p-value of 0.019, which also confirmed that information capability had a positive and significant effect on ROA.

Based on the findings, the study rejected the first null hypotheses and concluded that information capability significantly affects performance of commercial banks in Kenya. This study finding concurs with Lederer, Mirchandani and Sims (2001) who found out that firms that use the internet to publish products and services information achieve flexibility, customer retention and improved performance. Similarly, the study finding concurs with Zhu (2004) who established that firms that use e-commerce are enabled to access new markets, create new distribution channels and attract potential and new customers thereby improving firm performance. Merono-Cerdan and Soto-Acosta (2007) also observed that there is a relationship between firm EC: information and customization capability strongly support the positive performance of a firm.

H₀₂: Transaction Capability has no Significant Effect on Performance of Commercial Banks in Kenya

H_{02a}: Transaction capability has no significant effect on ROE of commercial banks in Kenya.

The second objective of this study aimed to test the effect of transaction capability on the financial performance of commercial banks in Kenya. The coefficient of transaction capability was at $\beta=1.926$, $p=0.150$, <0.05 , implying a statistically insignificant relationship between transaction capability and ROE of commercial banks in Kenya.

H_{02b}: Transaction capability has no significant effect on return on equity of commercial banks in Kenya.

Similarly, the coefficient of transaction capability was $\beta=0.332$, $p=0.178$, <0.05 . This also implied a statistically insignificant relationship between transaction capability and ROA of commercial banks in Kenya. The study failed to reject the second null hypotheses and concluded that transaction capability has no significant effect on ROA of commercial banks in Kenya.

The study findings indicate that increase in transaction capability implies increase in the ROA of commercial banks. This concurs with the views of Croom (2000) that improved processing ability can be attained by using e-commerce to cut down on expenses. Along similar lines, DaSilveira (2003) found out that e-commerce transaction capability, comprising the ability to conduct online transactions such as buying, online payment and provision of web security can minimize operational costs, leading to profitability.

H₀₃: Customization Capability has no Significant Effect on Performance of Commercial Banks in Kenya

H_{03a}: Customization capability has no significant effect on return on assets of commercial banks in Kenya.

The third objective of this study sought to test the effect of customization capability on the financial performance of commercial banks in Kenya. The coefficient of customization capability was at $\beta=2.773$, $p=0.038$, >0.05 . It suggests a statistically significant relationship between customization capability and ROE of commercial banks in Kenya.

H_{03b}: Customization capability has no significant effect on return on equity of commercial banks in Kenya.

Similarly, the coefficient of customization capability was $\beta=0.481$, $p=0.044$, >0.05 . This also revealed a statistically significant relationship between customization capability and ROA of commercial banks in Kenya. The study rejected the third null hypothesis and concluded that customization capability significantly effects on ROA of commercial banks in Kenya.

The research findings point out that enhancing customization capability would lead to increased performance of commercial banks in Kenya. Kiron, Prentice and Ferguson (2012) also revealed that customization capability results into improved performance.

Further, Liebowitz (2013) also established that customization leads to an increase in sales and that contributes overall performance of the firm.

H₀₄: Back-end Integration Capability has no Significant Effect on Performance of Commercial Banks in Kenya

H_{04a}: Back-end integration capability has no significant effect on ROE of commercial banks in Kenya.

The fourth objective of the study sought to establish the effect of the back-end integration capability on financial performance of commercial banks in Kenya. The coefficient of back-end integration capability was at ($\beta=0.827$, $p=0.001$, >0.05). These findings revealed that back-end integration capability significantly and positively affects the ROE of commercial banks in Kenya. The study rejected the fourth null hypothesis and concluded that back-end integration capability significantly affects the ROE of commercial banks in Kenya.

H_{04b}: Back-end integration capability has no significant effect on ROA of commercial banks in Kenya.

As noted earlier, the fourth objective of the study sought to establish the effect of the back-end integration capability on financial performance of commercial banks in Kenya. The coefficient of back-end integration capability was at $\beta=4.833$, $p=0.000$, >0.05 . These findings revealed that back-end integration capability significantly and positively affects

the ROA of commercial banks in Kenya. The study rejected the fourth null hypothesis and concluded that back-end integration capability significantly affects the ROA of commercial banks in Kenya. The finding implied that enhancing back-end integration capability on e-commerce platforms would lead to increased performance of commercial banks in Kenya. The study results concur with those of Zhu (2004) who found out that there exists a positive relationship between e-commerce back-end integration and firm performance.

4.4.3 Moderation effect of business operating environment on the relationship between e-commerce capability and performance

This section presents the research finding of moderating effects of business operating environment on the relationship between e-commerce capability and performance of commercial banks. In this section, a number of regression models were conducted to the moderating effect of business operating environment on the relationship between e-commerce capability with ROE and ROA of commercial banks.

Regression model was used to test for the moderating effect. The interaction variable was introduced to test if the coefficient of the interaction term (e-commerce capability composites* business operating environment) is statistically significant. The co-efficient for interaction term gives the strength and direction of the moderating variable.

Table 4.13: (a) Model Summary on Moderating Effect on ROE

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate
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	0.798	0.637	0.606	10.311
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a Dependent Variable: ROE

3 Predictors: (Constant), Interaction Variable, E-commerce Capability, Business Operating Environment

Source: Study Data (2018)

The model summary presented in Table 4.13 (a) reveals that model linking e-commerce capability composite, the moderating variable and interaction variable had adjusted R-squared = 0.606. This statistics implies that Business Operating Environment accounted for 60.6% of the variation in ROE and while 39.4% variation is explained by other variables.

Table 4.13: (b) Model Summary on Moderating Effect on ROA

ROA	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.782	0.611	0.576	1.776

a Dependent Variable: ROA

a Predictors: (Constant), Interaction Variable, Ecommerce Capability, Business Operating Environment

Source: Study Data (2018)

Likewise, the model summary presented in Table 4.13 (b) revealed that the model linking e-commerce capability composite, the moderating variable and the interaction variable had Adjusted R-squared =0.576 meaning that Business Operating Environment explains 57.6% variation in ROA. The remaining 42.4% is explained by other variables. These findings implied that Business Operating Environment, enhanced the relationship between e-commerce capability and performance of commercial banks in Kenya.

The study findings concur with Delis, Molyneux and Pasiouras (2011). These authors also found out that bank regulations and incentives that stimulate private monitoring and restrictions on banks' operations had a positive effect on the efficiency of commercial banks. Similarly, Lee and Chih (2013) indicated that banks were affected by bank regulation ratios set by the regulating authorities.

Table 4.14: (a) ANOVA Results for Moderating Effect on ROE

Model		Sum of Squares	Df	Mean Square	F	Sig.
3	Regression	6704.563	3	2234.854	21.023	0.000
	Residual	3827.071	36	106.308		
	Total	10531.63	39			

a Dependent Variable: ROE

3 Predictors: (Constant), Interaction Variable, E-Commerce Capability, Business Operating Environment

Source: Study Data (2018)

The findings presented in Table 4.14 (a) indicates that model linking e-commerce capability, CBK regulation, interaction variable (e-commerce capability*Business Operating Environment) and ROE had f-statistics =21.023, p=0.000 <0.05. This implied that the model was statistically significant.

Table 4.14: (b) ANOVA Results for Moderating Effect on ROA

ROA		Sum of Squares	Df	Mean Square	F	Sig.
3	Regression	168.31	3	56.103	17.788	0.000
	Residual	107.239	34	3.154		
	Total	275.549	37			

b Predictors: (Constant), Interaction Variable, Ecommerce Capability, Business Operating Environment

Source: Study Data (2018)

Table 4.14 (b) reveals that the model linking e-commerce capability, Business Operating Environment, interaction variables (e-commerce capability*Business Operating Environment) and ROA had f-statistics =17.788, p=0.000 <0.05. this indicates these variables are statistically significant. This also means that this model was also statistically significant.

Table 4.15 (a) Regression Coefficients Results for Moderating Effect on ROE

Variables	β	Std. Error	Beta	t	Sig.
(Constant)	35.358	15.268		2.316	0.026
E-Commerce Capability	15.038	5.46	0.826	2.754	0.009
Business Operating Environment	1.102	4.127	0.085	0.267	0.791
Interaction Variable	0.201	1.419	0.066	0.141	0.888

a Dependent Variable: ROE

Source: Study Data (2018)

Based on the analysis in Table 4.15 (a), the following model was formulated.

$$ROE_i = 35.358 + 15.038(EC) + 1.102(BE) + 0.201(BE_i * EC_i) + \varepsilon_i$$

In model presented, the interaction variable (e-commerce capability*business operating environment) had a *beta* coefficients of 0.201 with a p-value of 0.888. This also confirmed that interaction variable (e-commerce capability*business operating environment) had a positive and insignificant effect on ROE. Based on these findings, the study failed to reject the fifth null hypothesis and concluded that the business operating environment does not have a significant moderating effect on the relationship between e-commerce capability and the ROE of commercial banks in Kenya. The study findings disagree with Delis, Molyneux and Pasiouras (2011) who found out that bank regulations and incentives that stimulated private monitoring and restrictions on banks' operations had a positive effect on the efficiency of commercial banks.

Table 4.15 (b) Regression Coefficients Results for Moderating Effect on ROA

		B	Std. Error	Beta	t	Sig.
3	(Constant)	5.33	2.63		2.026	0.051
	E-Commerce Capability	2.281	0.941	0.745	2.425	0.021
	Business Operating Environment	0.083	0.719	0.039	0.115	0.909
	Interaction Variable	0.016	0.246	0.032	0.066	0.948

a Dependent Variable: ROA

Source: Study Data (2018)

Based on the analysis in Table 4.15(b), the following models were formulated.

$$ROA_i = 5.33 + 2.281EC_i + 0.083BE_i + 0.016 BE_i * EC_i + \varepsilon_i$$

Similarly, in the model presented in Table 4.14 (b), interaction variable (e-commerce capability*Business Operating Environment) had a *beta* coefficients of 0.016 with a p-value of 0.948, confirming that interaction variable (e-commerce capability*Business Operating Environment) had a positive and insignificant effect on ROA. The study also failed to reject the fifth null hypothesis and concluded that business operating environment has no significant moderating effect on the relationship between e-commerce capability and ROA of commercial banks in Kenya.

These findings on the moderating effect of business operating environment on the relationship between e-commerce capability and performance of commercial banks. The implication is that business operating environment had a positive but insignificant moderating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya. The regulations set by CBK can sometimes be very strict. They may even prevent commercial bank in leveraging the power of technology such as e-commerce. This is for the fear that it results into unethical practices that may affect the industry. Hence, Business Operating Environment play a significant role in the entire operations of the commercial banks in Kenya.

These findings, however, disagree with the stance of Delis, Molyneux and Pasiouras (2011) who found out that bank regulations and incentives that stimulate private

monitoring and restrictions on banks' operations had a positive effect on efficiency. Similarly, Lee and Chih (2013) indicated that banks were affected by bank regulation ratios set by the regulating authorities.

4.4.4 Mediation effect of competitive advantage on the relationship between e-commerce capability and performance

Objective Four of the study sought to test the mediation effect of competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya. To test for the mediation effect, the study adopted the four steps as suggested by Baron and Kenny (1986).

Step One: E-commerce Capability and Performance

In the first step for testing for mediation effect, a regression analysis was computed with e-commerce capability predicting performance of commercial banks in Kenya. Two models were conducted, one with ROE and another with ROA as measures of performance.

Table 4.16: Step One Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
ROE	0.797	0.635	0.625	10.062
ROA	0.779	0.607	0.597	1.733

a Predictors: (Constant), E-Commerce Capability

Source: Study Data (2018)

The first model linking, e-commerce capability and ROE yield a R-squared =0.635 implying that e-commerce capability accounted for 63.5% of the variation in ROE and 60.7% of the variation in ROA as shown by the findings in the second model. The findings implied that e-commerce capability had high explanatory power on performance of commercial banks in Kenya.

Similarly, the study finding concurs with Zhu (2004) who established that firms that use e-commerce are enabled to access new markets, create new distribution channels and attract potential and new customers. Merono-Cerdan and Soto-Acosta (2007) also observed that there is a relationship between firm e-commerce capability: information and customization capability strongly support the positive performance of a firm.

Table 4.17: Step One: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
ROE	Regression	6684.634	1	6684.634	66.03	0.000
	Residual	3846.999	38	101.237		
	Total	10531.63	39			
ROA	Regression	167.373	1	167.373	55.7	0.000
	Residual	108.176	36	3.005		
	Total	275.549	37			

b Predictors: (Constant), E-Commerce Capability

Source: Study Data (2018)

The ANOVA results presented in Table 4.17 indicate that both models linking e-commerce capability with both ROA and ROE had a good fitness as shown by $f=66.03$, $p=0.000$

<0.05, for the first model and $f=55.7$, $p=0.000 <0.05$. The finding implies that e-commerce capability significantly predicted both ROA and ROE. Similarly, the study finding concurs with the views of Zhu (2004) who established that firms that use e-commerce can access new markets, create new distribution channels and attract potential and new customers. Merono-Cerdan and Soto-Acosta (2007) also observed that there was a relationship between firm e-commerce capability: information and customization capability strongly support the positive performance of a firm.

Table 4.18: Step One: Regression Coefficients Results

		B	Std. Error	Beta	t	Sig.
ROE	(Constant)	31.864	5.632		5.658	0.000
	E-commerce Capability	14.499	1.784	0.797	8.126	0.000
ROA	(Constant)	5.14	1.021		5.036	0.000
	E-Commerce Capability	2.386	0.32	0.779	7.463	0.000

Source: Study Data (2018)

Optimal Models for the step one;

$$\mathbf{ROA}_i = \mathbf{5.14} + \mathbf{2.386 (E-commerce Capability}_i) + \boldsymbol{\varepsilon}_i$$

$$\mathbf{ROE}_i = \mathbf{31.864} + \mathbf{14.499 (E-commerce Capability}_i) + \boldsymbol{\varepsilon}_i$$

In the first model, EC had a *beta* coefficient of 14.499, $p=0.000 < 0.05$. This means that e-commerce capability had a significant effect on ROE. Similarly, in the second model, e-commerce capability had a *beta* coefficient of 2.386, $p=0.000 < 0.05$. This suggests that e-commerce capability significantly predicted the ROA of commercial banks in Kenya.

Step Two: E-commerce Capability and Competitive Advantage

Step two in the test for mediation involved e-commerce capability (independent variable) predicting competitive advantage (Mediating variable). This regression was fitted and the findings are presented in tables 4.18 to 4.20.

Table 4.19: Step Two: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.59	1	20.59	10.173	0.003
	Residual	76.91	38	2.024		
	Total	97.5	39			

a Dependent Variable: Competitive Advantage

b Predictors: (Constant), E-Commerce Capability

Source: Study Data (2018)

The ANOVA results presented in Table 4.19 indicates that the model linking e-commerce capability and competitive advantage had a good fitness as shown by $f=10.173$, $p=0.003 < 0.05$. The findings imply that e-commerce was a significant predictor variable of competitive advantage.

Table 4.20: Step Two: Model Summary on E-commerce Capability and Competitive Advantage

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.46	0.211	0.19	1.423

a Predictors: (Constant), E-Commerce Capability

Source: Study Data (2018)

The model linking, e-commerce capability and competitive advantage yield an R-squared =0.460, meaning that ecommerce capability accounted for 46.0% of the variation in competitive advantage measured by customer satisfaction. Aranyossy (2010) likewise revealed that e-commerce capability improved performance of a firm.

Table 4.21: Step Two: Regression Coefficients Results

	B	Std. Error	Beta	t	Sig.
1 (Constant)	0.813	0.796		1.022	0.313
E-commerce Capability	0.805	0.252	0.46	3.19	0.003

a Dependent Variable: Competitive Advantage

Source: Study Data (2018)

Optimal Model for the step two.

$$\text{Competitive Advantage} = 0.813 + 0.805 (\text{E-commerce Capability}) + \varepsilon_i$$

The *beta* coefficient of e-commerce capability in Table 4.21 was $\beta=0.805$, $p=0.003$ which was less than the critical p of 0.05. These results show that e-commerce capability had a significant effect on competitive advantage of commercial banks in Kenya. The second step for mediation test was achieved. This finding concurs with the stance of Bhatt and

Grover (2005), postulating that e-commerce capability is a key tool for provision of competitive advantage to firms; it enables banks to reach new territories, improve service delivery and increase competitive advantage. Porter (2008) argued that the relationship between customers and business firms has strongly developed to a direction where the customers have a dictating position in the sense of bargaining power. With such power, customers have become more demanding towards service providers.

Step Three: Competitive Advantage and Performance

Step three in test for mediation involved fitting competitive advantage and performance of commercial banks in Kenya. The findings of this regression analysis are presented in tables 4.21 to 4.23.

Table 4.22: Step Three: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
ROE	0.672	0.452	0.438	12.325
ROA	0.651	0.424	0.408	2.099

a Predictors: (Constant), Competitive Advantage

Source: Study Data (2018)

The findings of model summary presented in Table 4.21 imply that the model linking competitive advantage and performance yielded R=square of 0.452 and 0.424 for the first

and second models. These findings indicate that competitive advantage accounted for 45.2% of the variation in the ROE and 42.4% of the variation in ROA.

Table 4.23: Step Three: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
ROE	Regression	4759.667	1	4759.667	31.335	0.000
	Residual	5771.967	38	151.894		
	Total	10531.63	39			
ROA	Regression	116.893	1	116.893	26.524	0.000
	Residual	158.656	36	4.407		
	Total	275.549	37			

b Predictors: (Constant), Competitive Advantage

Source: Study Data (2018)

The ANOVA results presented in Table 4.23 indicated that both models linking competitive advantage with both ROA and ROE were statistically significant as shown by $f=31.335$, $p=0.000 < 0.05$, for the first model and $f=26.524$, $p=0.000 < 0.05$. The finding implied that customer satisfaction significantly predicted both ROA and ROE. Customer satisfaction has emerged as a crucial strategy that a business organization can use to obtain competitive advantage.

Johnston and Clark (2008) argued that gaining competitive advantage in today's service firms is a very serious task for management. This is because they need to find a way to deliver superior value to their customers through technological innovations such as e-commerce capability. Khan and Haseeb (2015) advance that there is correlation between

customer satisfaction and firm performance. Further, competitive advantage measurement should seek to understand the gap between customer expectations and performance perceptions. Adding their voice, Wang and Shieh (2006), found out that that customers are the cornerstone of any commercial enterprise.

Table 4.24: Step Three: Regression Coefficients Results

		B	Std. Error	Beta	T	Sig.
ROE	(Constant)	10.67	4.5		2.371	0.023
	Competitive Advantage	6.987	1.248	0.672	5.598	0.000
ROA	(Constant)	1.725	0.832		2.074	0.045
	Competitive Advantage	1.16	0.225	0.651	5.15	0.000

Source: Study Data (2018)

Optimal Models for step three test for mediation

$$ROE_i = 10.67 + 6.987 (\text{Competitive Advantage}) + \epsilon_i$$

$$ROA_i = 1.725 + 1.16 (\text{Competitive Advantage}) + \epsilon_i$$

In the first model, competitive advantage had a *beta* coefficient of 6.987, $p=0.000 < 0.05$, meaning that competitive advantage had a significant effect on ROE. Similarly, in the second model, competitive advantage had a *beta* coefficient of 1.16, $p=0.000 < 0.05$. This implies that competitive advantage significantly predicted the ROA of commercial banks in Kenya. Therefore, the third step in test for mediation was achieved. The study finding concurs with the sentiments of Khan and Haseeb (2015) that there is correlation between competitive advantage and firm performance. Thus, competitive advantage measurement

should understand the gap between customer expectations and performance perceptions. Similarly, Wang and Shieh (2006), further aver that customers are the cornerstone of any commercial enterprise.

Step Four: E-commerce Capability and Competitive Advantage predicting Performance

The final step in testing for mediation involved fitting e-commerce capability and competitive advantage on performance of commercial banks in Kenya. The findings of this regression analysis are presented in tables 4.24 to 4.26.

Table 4.25: Step Four: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
ROE	0.868	0.754	0.74	8.376
ROA	0.853	0.728	0.713	1.462

a Predictors: (Constant), Competitive Advantage, E-Commerce Capability

Source: Study Data (2018)

The first model linking e-commerce capability, competitive advantage and ROE yield a R-squared =0.754, implying that e-commerce capability and competitive advantage accounted for 75.4% of the variation in ROE and 72.8% of the variation in ROA as shown by the findings in the second model. The findings show that e-commerce capability and competitive advantage had high explanatory power on performance of commercial banks in Kenya.

The study finding concurs with views of Zhu (2004) that firms that use e-commerce can access new markets, create new distribution channels and attract potential and new customers. Merono-Cerdan and Soto-Acosta (2007) also observed that there was a relationship between firm e-commerce capability: information and customization capability strongly support the positive performance of a firm.

Table 4.26: Step Four: ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
ROE	Regression	7936.007	2	3968.004	56.563	0.000
	Residual	2595.627	37	70.152		
	Total	10531.63	39			
ROA	Regression	200.716	2	100.358	46.938	0.000
	Residual	74.833	35	2.138		
	Total	275.549	37			

b Predictors: (Constant), Competitive Advantage, E-Commerce Capability

Source: Study Data (2018)

The ANOVA results presented in Table 4.26 indicate that both models linking e-commerce capability and competitive advantage with both ROA and ROE were statistically significant. This is shown by f-statistics =56.563, p=0.000 <0.05, for the first model and f-

statistics =46.938, p=0.000 <0.05. The finding implied that e-commerce capability and competitive advantage significantly predicted both ROA and ROE of commercial banks in Kenya.

The study finding concurs with Zhu (2004) who established that firms that use e-commerce are enabled to access new markets, create new distribution channels and attract potential and new customers. Merono-Cerdan and Soto-Acosta (2007) also observed that there is a relationship between firm e-commerce capability: information and customization capability strongly support the positive performance of a firm.

Table 4.27: Step Four: Regression Coefficients Results

		B	Std. Error	Beta	t	Sig.
ROE	(Constant)	35.145	4.752		7.396	0.000
	E-Commerce Capability	11.253	1.672	0.618	6.729	0.000
	Competitive Advantage	4.034	0.955	0.388	4.224	0.000
ROA	(Constant)	5.884	0.881		6.676	0.000
	E-Commerce Capability	1.874	0.299	0.612	6.261	0.000
	Competitive Advantage	0.688	0.174	0.386	3.949	0.000

Source: Study Data (2018)

Optimal Models for step four test for mediation

$$ROA_i = 5.884 + 1.874 * (E-Commerce Capability)_i + 0.688 (Competitive Advantage)_i + \epsilon_i$$

$$ROE_{it} = 35.145 + 11.253 (\text{E-Commerce Capability})_i + 4.034 (\text{Competitive Advantage})_i + \varepsilon_i$$

In the first model, e-commerce capability had a *beta* coefficient of 11.253, $p=0.000 < 0.05$, meaning that e-commerce capability had a significant effect on ROE. Competitive advantage had a *beta* coefficient of 4.034, $p=0.000 < 0.05$ indicating that competitive advantage significantly predicted ROE of commercial banks in Kenya. Similarly, in the second model, e-commerce capability had a *beta* coefficient of 1.874, $p=0.000 < 0.05$, implying that e-commerce capability significantly predicted ROA of commercial banks in Kenya. Competitive advantage had a *beta* coefficient of 0.688, $p=0.000 < 0.05$ implying that competitive advantage significantly predicted ROA of commercial banks in Kenya.

The study finding concurs with the position of Khan and Haseeb (2015) that there is correlation between competitive advantage and firm performance. Further, competitive advantage measurement should understand the gap between customer expectations and performance perceptions. Similarly, Wang and Shieh (2006), found out that customers are the cornerstone of any commercial enterprise.

Table 4.28: Summary of Mediating Effect of Competitive Advantage on Relationship between E-commerce Capability and Performance

		R2	Predictor Variable	Beta	P-Value	Significance
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Step1	ROE	0.635	E-commerce Capability	14.499(0.000)	<0.05	Significant
	ROA	0.607	E-commerce Capability	2.386(0.000)	<0.003	Significant
Step 2	Competitive Advantage	0.46	E-commerce Capability	0.805	<0.005	Significant
Step 3	ROE	0.452	Competitive Advantage	6.987(0.000)	<0.005	Significant
	ROA	0.424	Competitive Advantage	1.16(0.006)	<0.005	Significant
Step 4	ROE	0.754	E-commerce Capability	11.253(0.000)	<0.005	Significant
			Competitive Advantage	4.034(0.000)	<0.005	Significant
	ROA	0.728	E-commerce Capability	1.874 (0.000)	<0.005	Significant
			Competitive Advantage	0.688(0.000)	<0.005	Significant

Source: Study Data (2018)

Since both e-commerce capability and competitive advantage significantly predict performance, the study concluded that competitive advantage partially mediated the relationship between e-commerce capability and performance of commercial banks in Kenya. Hence, the study rejected the sixth null hypothesis and concluded that competitive advantage competitive advantage has significant mediating effect on the relationship between e-commerce capability and performance of commercial banks in Kenya.

The findings concur with the observations of Porter (2008) that the relationship between customers and business firms has strongly developed to a direction where the customers have a dictating position in the sense of bargaining power. Similarly, Khan and Haseeb

(2015) advances that there is correlation between Competitive Advantage and firm performance and that Competitive Advantage measurement should consider an understanding of the gap between customer expectations and performance perceptions.

Table 4.29: Summary of the Hypotheses Testing

Hypotheses	Results	Decision
<i>H₀₁ (a): Information capability has no significant effect on ROE of commercial banks in Kenya.</i>	<i>P=0.003 < 0.05)</i>	<i>Reject H₀₁(a)</i>
<i>H₀₁ (b): Information capability has no significant effect on ROA of commercial banks in Kenya.</i>	<i>P=0.019 < 0.05)</i>	<i>Reject H₀₁(b)</i>
<i>H₀₂ (a): Transaction capability has no significant effect on ROE of commercial banks in Kenya.</i>	<i>P=0.150 >0.05)</i>	<i>Failed to Reject H₀₂(a)</i>
<i>H₀₂ (b): Transaction capability has no significant effect on ROA of commercial banks in Kenya.</i>	<i>P=0.178 >0.05)</i>	<i>Failed to Reject H₀₂(b)</i>
<i>H₀₃ (a) Customization capability has no significant effect on ROE of commercial banks in Kenya.</i>	<i>P=0.038 < 0.05)</i>	<i>Reject H₀₃(a)</i>
<i>H₀₃ (b) Customization capability has no significant effect on ROA of commercial banks in Kenya.</i>	<i>P=0.044 < 0.05)</i>	<i>Reject H₀₃ (b)</i>
<i>H₀₄ (a) Back-end integration capability has no significant effect on ROE of commercial banks in Kenya.</i>	<i>P=0.000 < 0.05)</i>	<i>Reject H₀₄ (a)</i>
<i>H₀₄ (b) Back-end integration capability has no significant effect on ROA of commercial banks in Kenya.</i>	<i>P=0.001 < 0.05)</i>	<i>Reject H₀₄ (b)</i>
<i>H₀₅(a) Business operating environment has no significant moderating effect on the relationship between e-commerce capability and on ROE of commercial banks in Kenya.</i>	<i>Moderated Multivariate linear regression analysis</i>	<i>Failed to reject H₀₅(a)</i>

Hypotheses	Results	Decision
<i>H_{05(a)}</i> Business operating environment has no significant moderating effect on the relationship between e-commerce capability and on ROA of commercial banks in Kenya.	<i>Moderated Multivariate linear regression analysis</i>	<i>Failed to reject H_{05(a)}</i>
<i>H_{06 (a)}</i> Competitive Advantage has no significant mediating effect on the relationship between e-commerce capability and on ROE of commercial banks in Kenya.	<i>A four step approach as recommended by Baron and Kenny (1986)</i>	<i>Reject H₀₆</i>
<i>H_{06 (b)}</i> Competitive Advantage has no significant mediating effect on the relationship between e-commerce capability and on ROA of commercial banks in Kenya.	<i>A four step approach as recommended by Baron and Kenny (1986)</i>	<i>Reject H₀₆</i>

Source: Study Data (2018)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter is a summary of the findings, conclusions, recommendations and contribution of the study to knowledge and suggestions for further studies. The summary of the major findings were presented alongside specific research objectives of the study. Conclusions and recommendations made by this study streamed from the study findings.

5.2 Summary

Commercial banks play a key role of financial intermediation between depositors and borrowers, prompting a more productive allocation of resources and faster economic growth of any nation. Kenya's Vision 2030 economic blueprint (2008 – 2030) seeks to convert Kenya into a second world nation. The Government of Kenya through CBK has provided an enabling environment, supporting legal and regulatory framework. Such include regulation of interest rates to ensure that commercial banks contribute towards the realization of Vision 2030 prosperous economy. In order to play their intermediation role, commercial banks have to be profitable and have thus invested heavily in e-commerce solutions. Despite these initiatives by the government coupled with the heavy investments in e-commerce, commercial banks have presented mixed results in terms of their performance.

This study, therefore, investigated the effect of E-commerce capability on performance of commercial banks in Kenya. The specific objectives of the study were to establish the effect of e-commerce information capability, transaction capability, customization capability and back-end integration capability on performance of commercial banks in Kenya. The study also sought to establish the moderation effect of the business environment on the relationship between e-commerce capability and performance of commercial banks in Kenya and determine the mediation effect of Competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya. The study was anchored on UTAUT Theory and supported by DCT, RBV Theory as well as CA Theory.

The study was guided by positivism research philosophy and used explanatory non-experimental design. A census of 43 commercial banks was taken and data for performance extracted for the financial year 2016/17. Data was collected from commercial banks websites. Data analysis was done using descriptive statistics to provide summaries of data while multiple regression models were used to test all the hypotheses.

The study analyzed the effect of information capability on performance of commercial banks in Kenya. Multivariate regression analysis revealed that information capability had a significant positive effect on both ROE and ROA. This also confirmed that information

capability had a positive and significant effect on performance of commercial banks in Kenya. Based on the findings, the study rejected the null hypothesis.

The study analyzed the effect of transaction capability on performance of commercial banks in Kenya. In regression analysis, the coefficient of transaction capability was statistically insignificant both on ROE and ROA. This implies that the relationship between transaction capability and performance of commercial banks in Kenya was positive and insignificant.

Similarly, this study sought to establish the effect of e-commerce customization capability on performance of commercial banks in Kenya. The beta coefficient of customization capability revealed a statistically significant relationship between customization capability and ROE of commercial banks in Kenya. Similarly, the coefficient of customization capability also revealed a statistically significant relationship between customization capability and the ROA of commercial banks in Kenya.

The study further sought to establish the effect of Back-end capability on performance of commercial banks in Kenya. In the regression analysis, Back-end integration capability was found to have a significant positive effect on both ROA and ROE of commercial

banks in Kenya. These findings revealed that Back-end integration capability has a significant and positive effect on both ROA and ROE of commercial banks in Kenya.

The study further sought to determine the moderation effect of business operating environment on the relationship between e-commerce capability and performance of commercial banks in Kenya. The interaction Variable had a positive and insignificant effect on ROE and ROA of commercial banks in Kenya.

The study sought to test the mediation effect of Competitive advantage on the relationship between e-commerce capability and performance of commercial banks in Kenya. Since both CE and CA significantly predict performance, then the study concluded that partially mediated relationship between e-commerce capability and performance of commercial banks in Kenya.

5.3 Conclusions

To convert Kenya into a middle-income nation that provides high quality of life to its citizens as engraved in Kenya Vision 2030's, commercial banks should play their crucial role of financial intermediation between depositors and borrower in order to prompt for more productive allocation of resources and faster economic growth in the country. ECs

such as information, customization and back-end integration capability are essential precursors to good performance.

The study noted that commercial banks e-commerce capability had significant effect on their performance. The study established that commercial banks that leveraged on information EC such as publishing products information through catalogues, flyers and online advertising achieved flexibility, customer satisfaction and improved performance. This is because, majority of the potential and existing customers learn about the new products offered by banks through such e-commerce platforms. In this era where internet has penetrated deeply in most regions, it is very easy to reach new markets through e-commerce platforms which impact positively on performance.

The study also concluded that commercial banks that relied on e-commerce customization capability achieved increased performance. Presence of online registration, online recommendation and real-time support leads to an increase in sales. Further, through analysis of website data, online firms are able to receive notifications when competitors lowered their prices of products. Consequently, this translates to increase in the overall performance of the firm.

Back-end capability was also noted play a crucial role in reducing the time spend at the banking hall; they guarantee customers bank services any time anywhere on earth, occurring in the current generation. The study finally concluded that commercial banks that have interactive e-commerce platforms have a better chance of attaining and maintaining high performance.

The study further concluded that commercial banks that leveraged on their competitive advantages achieved superior performance. Customer satisfaction emerged as a crucial strategy that a commercial banks can used to obtain competitive advantage and that translated to improved overall performance.

5.4 Contribution to Knowledge

Contribution of the research on the existing knowledge is critical in knowledge building and bridging of the existing gaps in theoretical and empirical literature. The section presents the contribution to theory, practice and policy.

This study expanded the theoretical knowledge on relationship between e-commerce capability and performance in the context of commercial banks in Kenya. The study further expanded the theoretical knowledge on moderating mediating effect of competitive advantage on the relationship between e-commerce capability and performance of

commercial banks. The study also expounded the utility of the UTAUT, DCT and RBV Theory in the context of e-commerce capability, business operating environment, CA and performance of commercial banks in Kenya.

This study provided insight on the role of e-commerce capability platforms on the performance of commercial banks. The management of commercial banks and other financial institutions may use the findings of this study to enhance their profitability through using e-commerce to open up new markets and reach new customers. The study contributes to knowledge on evolving business practices due to invention of internet and online business transactions. The study contributed to knowledge on the importance of e-commerce in the modern era and the need for customer in banking sector to continue access banking services without necessarily visiting the banking halls.

The findings of this study may be adopted by the board of directors and other policy making organs in commercial banks, to ensure the adoption of e-commerce capability through allocation resources for that purposes. The finding further contribute to policy formulation by CBK and other industry regulators to allow commercial banks to full leverage the use of e-commerce platforms to offer banking services to their customers.

5.5 Recommendations

The study notes that commercial banks that are yet to fully embrace e-commerce capability. The study findings showed that e-commerce capability significantly affected the performance of commercial banks in Kenya.. As a result, this study has significant implications to commercial banks, policy makers and academicians. Therefore, several recommendations have been derived from the research finds of this study.

Drawing from the findings, the study recommends management of the commercial banks managers should initiate technological reforms in commercial banks aimed at achieving better performance through adoption of e-commerce capability in this modern era. This will enable them to reach many clients and also encourage clients to use e-platforms in making bank transactions to increase flexibility and reduce queues in their banking halls.

The study further recommends that commercial banks in Kenya with unsatisfactory information capability should invest in modern systems to make their e-platforms customer friendly with adequate product information to ensure clients get the services they require in the effective and efficient manner, reducing transaction costs and ensuring that customers can access banking services anytime and everywhere.

The study recommends that the management of commercial banks in Kenya should invest more in customization capability to improve their performance. This will ensure reduction in operational costs especially marketing and transactions costs. For instance facilitating self-service via online account management and search tools will improve customer services and expand revenue sources. Instantaneous data analytics allow firms to provide customized services and products, including advertising. Over and above, customization enables firms to segment customers and serve them with promotional information on new offers.

Back-end integration capability was also found to be a significant predictor of performance. Therefore, the study recommends that banks should enhance electronic integration to facilitate inventory management, coordination and fulfilment between back offices and external users. This can be achieved through integration of technological tools such as EDI links, virtual communities and data sharing. This leads to decrease in operational cost.

Additionally, competitive advantage was found to significantly influence performance of commercial banks. customer satisfaction emerged as a key strategy that a business enterprises can use to gain competitive advantage. The relationship between customers and business firms has strongly developed to a point where the customers have a dictating

position in the sense of bargaining power. Accordingly, this study recommends that managers of commercial banks should consider delivering superior value to their customers through implementation of e-commerce capability.

The policy makers, and especially CBK and other stakeholders should formulate policies that allow commercial banks to fully leverage the use of e-commerce capability by commercial banks and other financial institutions. This is because e-commerce capability was found to be a significant predictor of firm performance. By formulating policies, commercial banks will be guaranteed of good performance and shareholders will be rewarded for their investments, besides promoting national development and economic growth.

In conclusion, the study recommends that academicians in the field of management information systems can utilize the findings of this study to advance knowledge by testing the robustness of other technology theories that can be applied in measuring the effect of E-commerce capability on firm performance.

5.6 Suggestions for Further Research

The field of e-commerce has received significant research in the recent past. However, there are still more research gaps, especially the contextual gaps that need to be addressed.

The study suggested that further studies should focus on establishing the effect of e-commerce capability in different sectors to expand the theoretical knowledge. Similarly, e-commerce capability is very wide. Further studies should focus on other c-commerce capabilities other than those in this study and find out how they affect performance of firms.

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APPENDDICES

Appendix I (a): Performance Data Extraction Tool

Name of The Bank		
	Performance Indicators	
Year	ROA	ROE
2017		

Appendix I (b): E-Commerce Website Evaluation Tool

Scale to be Used:

1=Very Unsatisfactory

2=Unsatisfactory

3=Moderately Satisfactory

4=Satisfactory

5=Very Satisfactory

Evaluate the following website's content using the scale provide above							
Bank			1	2	3	4	5
African Banking Corporation Ltd	Information						
	Product Information						
	Search Capability						
	Product Review						
	Transaction						
	Payment Capability						
	Account Management						
	Web Security						
	Customization						
	Online Registration						
	Online Recommendation						
	Real-time Support						
	Back-end Integration						
	EDI Links						
	Virtual Community						
	Data Sharing						

Appendix I (c): Data collection Tool for Business Operating Environment and Competitive Advantage

Commercial Banks	Years	Customer Satisfaction Index	Number of CBK prudential regulation Complied with
	2014		
	2015		
	2016		
	2017		
	2018		

Appendix II: Sampling Frame

1. African Banking Corporation Ltd.
2. Bank of Africa Kenya Ltd.
3. Bank of Baroda (K) Ltd.
4. Bank of India
5. Barclays Bank of Kenya Ltd.
6. CfC Stanbic Bank Ltd.
7. Chase Bank (K) Ltd.
8. Citibank N.A Kenya
9. Commercial Bank of Africa Ltd.
10. Consolidated Bank of Kenya Ltd.
11. Co-operative Bank of Kenya Ltd.
12. Credit Bank Ltd.
13. Development Bank of Kenya Ltd.
14. Diamond Trust Bank (K) Ltd.
15. Dubai Bank Kenya Ltd.
16. Ecobank Kenya Ltd
17. Equatorial Commercial Bank Ltd.
18. Equity Bank Ltd.
19. Family Bank Ltd
20. Fidelity Commercial Bank Ltd
21. Fina Bank Ltd
22. First community Bank Limited
23. Giro Commercial Bank Ltd.
24. Guardian Bank Ltd
25. Gulf African Bank Limited
26. Habib Bank A.G Zurich
27. Habib Bank Ltd.
28. 28.1 & M Bank Ltd
29. Imperial Bank Ltd.
30. Jamii Bora Bank Ltd.
31. Kenya Commercial Bank Ltd
32. K-Rep Bank Ltd
33. Middle East Bank (K) Ltd
34. National Bank of Kenya Ltd
35. NIC Bank Ltd
36. Oriental Commercial Bank Ltd
37. Paramount Universal Bank Ltd
38. Prime Bank Ltd
39. Standard Chartered Bank (K)Ltd
40. Trans-National Bank Ltd
41. Victoria Commercial Bank Ltd
42. UBA Kenya Bank Ltd.
43. Charterhouse Bank

Appendix III : Letter of Transmittal

Mutuku K. Morrisson

Department of Management Science

School of Business

Kenyatta University

P.O Box 43844-00100

Nairobi-KENYA

Email: kaunda.morrison@gmail.com

Phone:0724675396

Dear Respondent,

I am Ph.D student currently conducting a research study on, "**E-commerce Capability and Performance of Commercial Banks in Kenya**". This information is useful concerning future e-commerce solutions implementation plans in the banking sector.

All information collected from CBK reports and bank websites will be treated confidentially in the final report and if you would like to get a copy of the final report of this study please feel free to contact Kenyatta University.

Yours faithfully

Mutuku K.Morrisson

ADM. No. D86/CTY/29261/2014

Appendix IV : Research Permit


**THIS IS TO CERTIFY THAT:
MR. MORRISSON KAUNDA MUTUKU
of KENYATTA UNIVERSITY, 0-200
Nairobi, has been permitted to conduct
research in *Nairobi County***

**Permit No : NACOSTI/P/18/13528/21665
Date Of Issue : 12th March,2018
Fee Received :Ksh 2000**

**on the topic: *ELECTRONIC COMMERCE
CAPABILITY AND FINANCIAL
PERFORMANCE OF COMMERCIAL BANKS
IN KENYA***

**for the period ending:
12th March,2019**




.....
**Applicant's
Signature**


.....
**Director General
National Commission for Science,
Technology & Innovation**

Appendix V : CBK Prudential Regulations

REFERENCE	TITLE	PAGE
1. CBK/PG/01	Licensing of New Institutions	2
2. CBK/PG/02	Corporate Governance	34
3. CBK/PG/03	Capital Adequacy	82
4. CBK/PG/04	Risk Classification of Assets and Provisioning	125
5. CBK/PG/05	Liquidity Management	156
6. CBK/PG/06	Foreign Exchange Exposure Limits	178
7. CBK/PG/07	Prohibited Business	191
8. CBK/PG/08	Proceeds of Crime and Money Laundering (Prevention) and Combating the Financing of Terrorism	203
9. CBK/PG/09	Appointment, Duties and Responsibilities of External Auditors	242
10. CBK/PG/10	Publication of Financial Statements and Other Disclosures	253
11. CBK/PG/11	Opening of New Place of Business, Closing Existing Place of Business or Changing Location of Place of Business	288
12. CBK/PG/12	Mergers, Amalgamations, Transfers of Assets and Liabilities	310
13. CBK/PG/13	Enforcement of Banking Laws and Regulations	322
14. CBK/PG/14	Business Continuity Management	332
15. CBK/PG/15	Agent Banking	347
16. CBK/PG/16	Outsourcing	393
18. CBK/PG/17	Representative Offices	410
19. CBK/PG/18	Voluntary Liquidation	440
20. CBK/PG/19	Consolidated Supervision	447
21. CBK/PG/20	Stress Testing	457
22. CBK/PG/21	Prompt Corrective Action	467
23. CBK/PG/22	Consumer Protection	485