

**INFLUENCE OF ALTERNATIVE FINANCING ON THE RELATIONSHIP
BETWEEN OPERATIONAL CHARACTERISTICS AND EFFICIENCY OF
SMALL AND MEDIUM ENTERPRISES IN KENYA**

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DECLARATION

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This thesis is my original work and has not been presented for a degree in any other University or for any other award.

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DEDICATION

Dedicated to my immediate family: My wife Nancy Wangui Njau, my son Moses Waweru Njau and my daughter, Grace Nyokabi Njau, who gave me irreplaceable support throughout.

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ABBREVIATION AND ACRONYMS

AF	Alternative Finance
APO	Asian Productivity Organization
CBK	Central Bank of Kenya
CU	Credit Union
DEA	Data Envelopment Analysis
DEAP	Data Envelopment Analysis Program Version 2.1
DFA	Deterministic Frontier Analysis
EC	European Commission
EO	Entrepreneurial Orientation
EU	European Union
FDH	Free Disposal Hull
FI	Financial Inclusion/Financial Intermediation
FSD	Financial Support Division
GDP	Gross Domestic Product
GOK	Government of Kenya
IBRD	International Bank for Reconstruction and Development
ICSA	International Council of Securities Association
IDA	International Development Association, a member of WBG
IFAC	International Federation of Accountants
IFC	International Finance Corporation, member of WBG
KAM	Kenya Association of Manufacturers
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KIRDI	Kenya Industrial Research and Development Institute
KNBS	Kenya National Bureau of Statistics

KSh	Kenya Shillings
MESPT	Micro Enterprises Support Program Trust
MLR	Multiple Linear Regression
NBFI	Non-Bank Financial Institution
SACCO	Savings and Credit Co-operative Society
SFA	Stochastic Frontier Approach
SMEs	Small and Medium-size Enterprises
SPSS	Statistical Package for Social Sciences
TFA	Thick Frontier Approach
THB	Thai Baht, the currency of Thailand
UK	United Kingdom
UON	University of Nairobi
USITC	United States International Trade Commission
VIF	Variance Inflated Factor
WBG	Word Bank Group
WTO	World Trade Organization

ABSTRACT

Firm operational characteristics have long been used as management tools as well as systems for defining, identifying, measuring and ensuring continuous improvement in firms. Efficient firm operations are geared towards attaining and sustaining competitive advantage. Sustained competitive advantage assures survival and thrive of the firm through owner/manager action. The operational characteristics - efficiency nexus has received extensive theoretical, conceptual and scholarly attention globally, continuously accumulating a wealth of knowledge. While SMEs remain the core engine to development and economic growth globally, recent increased momentum of economic growth exacerbates credit services, necessitating Alternative Finance (AF). However, scholarly endeavours to explore the impact of alternative finance on operational characteristics - efficiency nexus has received little attention, more so for Small and medium-size enterprises (SMEs) who have unique financial needs. To counter this conundrum, a closer study of AF for SMEs is vital, to help close the credit gap and sustain efficiency growth momentum. The purpose of this study was to explore the influence of alternative finance on the relationship between operational characteristics and efficiency of SMEs in the manufacturing sector in Kenya. The study was guided by firm size, firm age and managerial competency as independent variables. Alternative finance as determined by level of alternative finance in an SME was the moderator, while the dependent variable was efficiency as measured by various inputs and outputs with the aid of the DEA model. The study used a cross-sectional research design. This study employed a mixed approach where qualitative and quantitative research approaches were used. The target population were SMEs registered with Kenya Association of Manufacturers (KAM). The accessible population was 136 Kenya Association of Manufacturers SMEs owner/managers who were using alternative finance in their firm's capital mix. The study used a self-administered semi structured questionnaire to collect primary and secondary data. The questionnaire was tested for reliability with Cronbach Alpha scores results within the 0.70 threshold. A pilot study was conducted using twenty-one firms randomly selected from the manufacturing sector. This study used descriptive statistics to analyse qualitative data using tables, figures and graphs and interpretations. Multiple Regression modelling was used to analyse the measurement model and test the hypothesized relationship in this study. this study used hierarchical moderated multiple regression analysis to test the moderating effect of AF on operational characteristics - efficiency nexus. For the overall model, the study found out that firm age, firm size and managerial competency are significant positive predictors of SME efficiency. The study further found out that AF moderates SME characteristics – efficiency relationship, with an R- square increase of 19.7%. Over and above the predictive power of SME characteristics on efficiency, the inclusion of AF enhanced the variance by 19.7%. To counter credit scarcity and related costs, information opacity and adverse selection, innovative potential intermediators in conjunction with, government, KAM and SMEs should open on-line hybrid bank-microfinance credit facilities for SMEs, to close the credit gap and inspire sustained efficiency growth momentum and support economic growth in Kenya.

CHAPTER ONE

INTRODUCTION

This chapter introduces the study by giving a brief background of the study, global, regional and local perspectives of the study. It then makes a Statement of the problem, defines the research objectives and states the research hypothesis. Further, the chapter highlights the significance of the study, the scope of the study and the limitation of the study. Finally, a definition of key operational terms is given.

1.1 Background of the Study

Small and Medium-size Enterprises (SMEs) remain the core engine to productivity and economic growth globally (Abdulsaleh & Worthington, 2013; Asian Productivity Organization [APO], 2015). Yet, adequacy of business finance determines their mortality rate (Abdulsaleh & Worthington, 2013; Ayyagari, Beck & Demirguc-Kunt, 2007; Jasra, Khan, Hunjira, Rehman, & Azam, 2011; Kihimbo, Ayako, Omoka & Otuya, 2012; Nangoli, Turinawe, Kituyi, Kusemererwa, & Jaaza, 2013; Zhou & Wit, 2009).

While Juma, (2017) found out that SME mortality rate in Kenya reaches 90% by their second birth day, Allen, Carletti, Qian, and Valenzuela, (2012) elucidate the vital role of alternative finance (AF) in corporate finance in their global focus study on AF, providing firm level data to underscore AF importance.

In their research, on management of business challenges among small and micro enterprises in Kenya, Ayyagari et al., (2007) identified lack of access to credit as one of the major challenges SME in Kenya face. While KNBS (2017); WBG - IBRD and IDA (2014) concur, no AF solutions were suggested. Waweru (2017) point out that

information concerning various sources of alternative finance was lacking, proposing that SME's would be better off if they could obtain the information, even if at a fee.

SMEs major challenges manifest through difficulties in financing start-ups and expansion, through high risk, small portfolios, and high transaction cost associated with commercial lending (Erick, 2014). Even though studies by Allen et al. (2005); and Giannetti, Burkart, & Elligensen (2011) point to some of the determinants influencing choice of alternative financing mode for SMEs, discourse on this area lingers on unresolved.

While available literature point to a positive relationship between operational characteristics and efficiency, Esho (2001) in a study between efficiency, size and other determinants of Australian organizations found a negative relationship. Similarly, Crapp (1983) found a negative efficiency-characteristic (size) relationship for US firms. Fried, Lovell, and Eeckaut (1993) found no relationship between size and efficiency for US organizations. Existing empirical studies have modelled characteristics as independent variable and efficiency as the dependent variable. Theoretically, efficiency of SMEs is impacted by various characteristics such as size, age, and managerial competency. Moreover, this relationship can be influenced by appropriate moderating variables.

Although the social-cultural and demographic issues impacting AF appear more pronounced in China, there are no conclusive universal findings to this end. Most of the times formal financial issues are addressed in boosting businesses, while other alternative sources of finance which could be beneficial or even supportive of the survival of financially constrained SMEs are largely ignored (Bowen, Morara & Mureithi, 2009).

1.1.1 SMEs Efficiency

While survival and sustainability of the SME is of great significance (Bowen et al., 2009; Anderson, 1983), various characteristics such as size, age, and managerial competency, influence their efficiency. Further, this relationship may be moderated by appropriate moderating variables such as alternative finance (AF) for SMEs (IFAC 2007; IFC 2010; Mwangi, 2014; Kiai, 2016). Prusa (2012) argues that an effective measure of efficiency encompasses both technical and allocative efficiency. Both can be simultaneously calculated using a “money- metric production” frontier framework which stipulates product heterogeneity and price endogeneity (Prusa, 2012).

The use of moderating variables afforded an in-depth analysis of all variables and their relationships, more so when seeking confirmatory findings. On SMEs financing to impact efficiency, Abdulsaleh and Worthington (2013) emphasize that SME access to finance is fundamental, if the SMEs are to play their role to sustain growth and spur innovation for national economic growth. European Integration Studies [EIS] (2005), concur, adding that SME development, influenced by efficiency, require concerted efforts by various parties, among the leading ones being local business associations (EIS, 2005). This informs the study’s choice of Kenya Association of Manufacturers (KAM, 2014).

According to WBG – IBRD and IDA (2015), there is need to increase the efficiency of the manufacturing sector as the main driver to increase growth and to involve local business associations. Recent studies show that SMEs are at least as important as large firms in the creation of gross and net new jobs (Abdulsaleh & Worthington, 2013; Jasra et al., 2011; Kihimbo et al., 2012). These studies point out that notwithstanding their importance, most SMEs are unable to exploit the increased market op-

portunities mainly due to lack of finance (Ayyagari et al., 2007; Beck, Demirgüç & Martinez, 2010).

In most countries, especially developing nations, lending to small businesses and entrepreneurs remain limited because financial intermediaries are apprehensive about supplying credit to SMEs due to their high risk, small portfolios, and high transaction cost associated with commercial lending (Ruirie, 2012; Beck et al., 2010).

1.1.2 SMEs Characteristics

SME characteristics are the internal aspects of an organization that are anticipated to influence its efficiency. These may include size, Age, and managerial competency among others. The size of an SME may very well be reflected by its total value of assets, the number of full time employees and its turnover (KAM, 2014; EC, 2011; EIS, 2005; World Bank Group - IBRD & IDA, 2017). The number of employees in an organization determines its size and consequently determine its efficiency (Woldie, Leighton & Adesua, 2008).

A higher efficiency is expected for an SME with a high number of employees due to high levels of specialization and division of labour. Efficiencies of SMEs decline with their age (Banerjee, 2014; Jasra et al., 2011; Nangoli et al., 2013). Thus, a negative relationship is expected between efficiency and the growth of young firms. The resource-based view of organizations denotes that the performance or efficiency of firms is influenced by its resources as well as competencies in order to develop competitive advantage (Penrose, 1959; Porter, 1985).

According to Carmeli (2001), one of the key competencies crucial in determining the level of performance of an organization is managerial competency. Managerial competency is the knowledge, skills and experience of managers of an organization. A

positive relationship is expected between managerial competency and efficiency of SMEs (Carmeli, 2001).

1.1.3 Alternative Financing

Various studies have found out a high correlation between alternative source of finance and financial performance of firms globally (Erick, 2014; Adenkule, Adegbite, & Fakayode, 2012; Musyoka, 2011). SMEs financial decisions and behaviour significantly differ from those of large firms (Forkuoh, Li, Affum-Osei, & Quaye, 2015; Abdulsaleh & Worthington, 2013; Berger & Udell, 1998). SMEs in start-up phase depend mainly on alternative finance (Abdulsaleh & Worthington, 2013). For SMEs, trade credit is the most prominent source of finance in both developing and developed countries (Giannetti, et al., 2011; Kim & Shin, 2007; Murfin & Njoroge, 2012; Allen, Qian & Qian, 2005). Financial needs challenge the survival and growth of SMEs in developing countries. Therefore, Non-Bank Financial Institutions (NBFI) are very important and pivotal in an economy (IFC, 2010; Kihimbo et al., 2012).

Historically, SMEs in developing countries have benefited from venture capital (Karanja, Memba & Gakure, 2012; Harrison & Mason, 1992). Other AFs adopted by varieties of SMEs include; loans from micro-finance institutions, private sources like personal savings, friends and relatives (Forkuoh et al., 2015). Isaksson, (2002) aimed at establishing the importance of informal finance for Kenyan manufacturing firms. Some of the reasons attributed to the preference of informal sources of finance from the study compared to formal sources were low interest rates, easier formalities as well as the issue of no collateral needed. In a free market, lower AF compared to bank rates implies an undersupply of formal finance in which case AF demand would escalate.

This implies existence of a relationship between alternative finance and efficiency. Berger and Udell, (1998) argues that financial needs as well as financing options of SMEs changes as the SME “metamorphoses through a peculiar life cycle’ (Waweru, 2017). SMEs formative stages are usually characterized by informational opaqueness, deficiency of trade history and high risk of failure (Cassar, 2004; Berger & Udell, 1998 & 2006; Abdulsaleh & Worthington, 2013; Huyghebaert & Van de Gucht, 2007); Waweru, 2017). Owing to these shortcomings, during their formative stages, SMEs capital structure are predominantly through alternative finance such as owner funding, family savings, insider funding and retained earnings (Cassar & Holmes, 2003; Abdulsaleh & Worthington 2013; Waweru, 2017). This study views alternative finance as the enabler for facilitating SMEs to grow to the next level.

1.2 Perspectives of Manufacturing SMEs and Characteristics

Global, regional and local scenarios are vital. Kenya’s current economic update, strategic vision and member welfare advocacy via Kenya Association of Manufacturers are considered briefly.

1.2.1 Global Perspective of Manufacturing SMEs and Characteristics

Studies globally have shown that only a few SMEs access formal long-term financing as a source of capital. Notice in Figure 1.1, depicting financing needs in terms of longevity and firm size (IFC, 2010; Arena, 2011). Further, non-bank financial institutions have been reported to be more prominent than formal banks in funding SMEs (Atieno, 2001). Alternative Finance (AF) sources of capital adopted by majority of SMEs include; trade credit, loan from micro-finance institutions and private sources - personal savings, friends and relatives (Forkuoh et al., 2015; Kihimbo et al., 2012; IFC, 2010; Baeck, Collins & Zhang, 2014; Stomper, 2001).

Although value addition through the manufacturing industry propels economic growth, many developing economies are yet to tap this synergy. Even though industrial development has been known to bring about economic revolutions in many economies, the trends in developing countries such as Kenya remain meagre, compared to the potential as shown in Table 1.1 (World Bank Group (WBG) - International Bank for Reconstruction and Development (IBRD), International Development Association, [IDA], 2015).

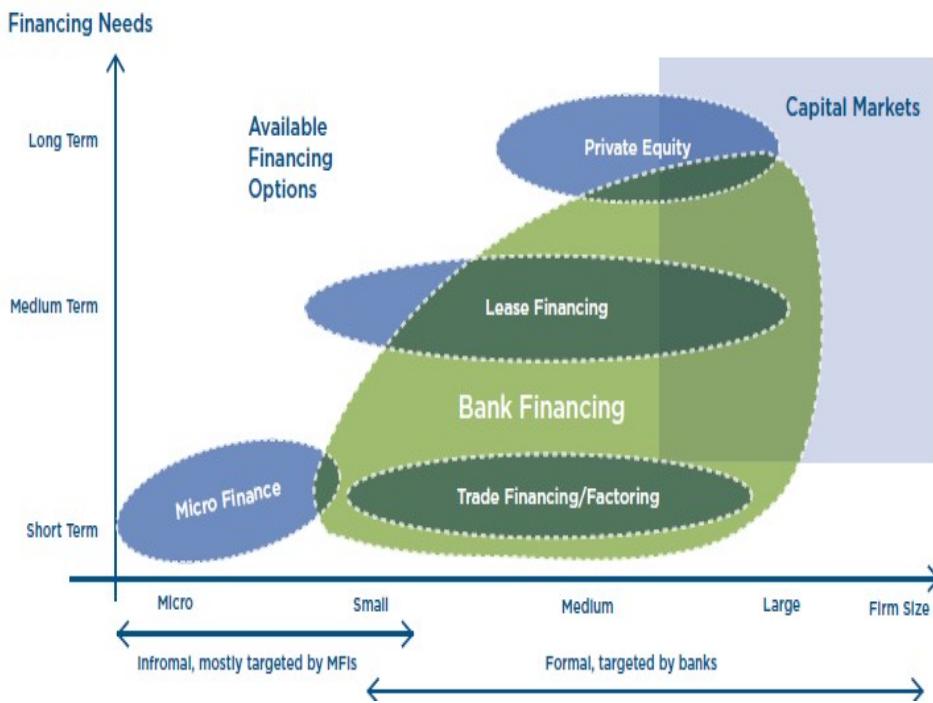


Figure 1.1: Firm Finance Coverage (IFC, 2010)

Globally, manufacturing SMEs contribute a much higher percentage of the Gross Domestic Product (GDP) of a country compared to the contribution of other sectors such as agriculture in the said country. According to WBG – IBRD and IDA (2015), as indicated in Table 1.1, in Germany, the average value added to GDP by the manu-

facturing industry between years 2010 and 2013 was 30.5% compared to 0.8% added by the agriculture industry. America's comparatives were 20.8%, and 1.3% while Egypt reported comparatives of 38.4% and 14.4% for manufacturing and agriculture industries respectively. According to Abdulsaleh and Worthington (2013) and Asian Productivity Organization [APO], (2015), SMEs remain the core engine to productivity and economic growth globally.

Table 1.1: Industry, Value Added (% of GDP) for Selected Countries

Year	Industry, value added (% of GDP) for selected countries									
	2010	2011	2012	2013	Average	2010	2011	2012	2013	Average
	Agriculture Sector				Manufacturing Sector					
Kenya	27.8	29.3	29.2	29.5	29.0	20.8	21	20.7	19.8	20.6
Korea	2.5	2.5	2.5	2.3	2.5	38.3	38.4	38.1	38.6	38.4
Ethiopia	44.7	44.7	48.8	45	45.8	10.2	10.5	10.3	11.9	10.7
Chad	53.2	53.1	55.8	51.5	53.4	12.3	13.1	12.7	15.4	13.4
America	1.2	1.4	1.3	1.3	1.3	20.4	20.8	21	21	20.8
Egypt	14	14.5	14.5	14.5	14.4	37.5	37.6	39.2	39.2	38.4
Germany	0.7	0.8	0.9	0.9	0.8	30	30.5	30.7	30.7	30.5
France	1.8	1.8	1.9	1.7	1.8	19.6	19.8	20	19.8	19.8

Source: WBG – IBRD and IDA (2015)

For any successful economy, SME development is the epitome of entrepreneurial alertness, managerial excellence and innovation (Bula, 2012; March, 1991; Mburiah, 2017; Mburiah, Wanjau, Kinyanjui, 2016; Schumpeter, 1942; USITC, 2010). Economies the world over therefore closely monitor SME performance, more so by the measure of their efficiency. Prusa (2012), underscores the importance of measuring SME economic efficiency, and proposes use of a “money- metric production” frontier framework which stipulates product heterogeneity and price endogeneity.

Abdulsaleh and Worthington (2013) emphasizes that SME's access to finance has a fundamental impact on their characteristics to achieve their survival, competitiveness

and growth. EIS (2005) point out that local business associations play a pivotal role impacting their characteristics to improve efficiency and achieve sustainable SME development (EIS, 2005).

Recent studies show that globally, SMEs are at least as pivotal as large firms in the creation of jobs (Abdulsaleh & Worthington, 2013; Jasra et al., 2011; Kihimbo et al., 2012). Globally, SME characteristics, being the internal aspects of an organization anticipated to influence its efficiency, including size, age, managerial competency, diversification, leverage and liquidity influence firm's performance (Kaguri, 2012).

The number of employees in an organization determines its size and thus its efficiency (Woldie et al., 2008). According to Banerjee (2014); Jasra et al. (2011) and Nangoli et al. (2013), efficiencies of SMEs decline with their age. According to Carmeli (2001), one of the key competencies crucial in determining the level of performance of an organization is managerial competency. Further, Mwangi (2014) cited size, managerial competency, adoption of technology, age and bond of association, as significant characteristics influencing efficiency of SACCOs.

1.2.2 Manufacturing SMEs and SME Characteristics in Kenya

In Kenya the manufacturing sector employs 30% of the workforce and contributes 14% to the GDP (Mkala, Wanjau, Kyalo, 2017). According to WBG – IBRD and IDA (2015), for the last thirty-one (31) years to 2013, the manufacturing sector's contribution to GDP has fluctuated between a high of 21% to a low of 17%, compared to Korea with an average of 38.4%, Table 1.1 (Government of Kenya – GOK, 2015; Kenya Institute for Public Policy Research and Analysis - KIPPRA 2013; WBG – IBRD & IDA, 2015). Kenya continues to rely heavily on agriculture with an average of 29% contribution to GDP between 2010 and 2013, compared to America whose economy's

reliance on agriculture was low at 1.3%, for the same period, Table 1.1, (WBG, - IBRD & IDA, 2015).

Locally, manufacturing SMEs contribute a much lesser percentage of the GDP compared to the contribution of other sectors such as agriculture. In 1980, industry and manufacturing accounted for 21 percent of Kenya's overall GDP. In 1990, it decreased to 19 percent, and in 2000, the value added to GDP decreased again to 17 percent. In 2011, there was a slight rise to 19 percent of Kenya's overall GDP. There is, therefore, a general declining trend.

According to WBG – IBRD and IDA (2015), as indicated in Table 1.1, the average value added to GDP by the manufacturing industry between years 2010 and 2013 was 20.6% compared to 29% added by the agriculture industry. Korea whose economy was at par with Kenya's at independence had comparatives of 38.4% and 2.5% for manufacturing and agriculture industries respectively, for the same period.

1.2.3 Kenya Economic Update

Gaya and Mogollon, in their WBG – IBRD and IDA, (2015) Kenya Economic Update report cite Kenya as being among the fastest growing economies in Africa, poised to achieve a 7% growth rate for year 2017. This was from a trajectory of 5.4 in 2014 to 6% in 2015 and 6.6% in 2016. Kenya had an expansive fiscal policy which allowed the country to finance infrastructure projects without exerting undue pressure on domestic financial markets, keeping public debt within the 50% threshold. Gaya and Mogollon (2015) argued that Kenya had sound economic policies in place to spur development. The 2017 World Bank report however show that GDP Growth in 2016 was 5.9%, supported by stable macroeconomic environment, low oil prices, increased tourism and an ambitious public investment drive.

Projected GDP growth for 2017 having slowed down to 5.5 percent, by March 2017, inflation rose to 5-year high at 10.3 percent, due to increased energy costs, with spill-overs to other sectors, (World Bank Group - IBRD & IDA, 2017). This scenario was further dampened by Kenya's public debt, currently estimated at 52%, projected to hit 55% by end of 2018. The report now notes sluggish external demand for exports and a declining production for export as dominant contributors of the increasing current account deficit. The main culprit here remains the manufacturing sector, which has stagnated in recent years. The report recommends urgent need to revive private sector, reversing negative credit growths and revenue mobilization by increasing turnover, (World Bank Group - IBRD & IDA, 2017).

According to various research works and institutional publications on the Kenyan economy, SMEs in Kenya as is in other economies employ a large share of the labour force. Further, the sector is perceived as an alternative employer. Notwithstanding their importance, most SMEs struggle and fail due to lack of finance (Ayyagari et al., 2007; KNBS, 2017; WBG - IBRD & IDA, 2014, 2017).

1.2.4 Kenya's Vision 2030

Kenya's Vision 2030 blue-print on the economic growth pillar proposes the strategies for creating a prosperous and globally competitive nation with a high quality of life by the year 2030 (GOK, 2015). The main driver is the transformation of manufacturing industry while ensuring a clean and secure environment. The economic pillars' strategy to achieve a constant 10% growth in the GDP has not been achieved this far.

The manufacturing sector whose growth has stagnated since 1960s remains the major drawback. Appendices [4(a) & (b)]; World Bank group, (2017), GDP per capita, PPP (current international \$) shows the GDP per capita Purchasing Power Parity (PPP) for

Kenya, South Africa, China and India for years 1964 to 2016. The superlative demonstrates Kenya's stagnation since 1964, while the trends for India, South Africa and China depict exponential trajectories with Chinas' portraying a higher exponential power.

The economy therefore requires a powerful tool to closely monitor the manufacturing sector for efficiency trends among others for resolution. This Vision 2030 is achievable, given Kenya's potential, the emerging liberalization of trade and the emerging One-Africa trading block, a market with more than 1.1 billion consumers.

The manufacturing sector in Kenya has high potential in employment creation and poverty alleviation since it is less affected by land size (Bigsten, Kimuyu, & Soderbom, 2010). Recent studies by World Bank on Kenya's manufacturing sector, reveal that contribution of the manufacturing sector to GDP has continued to stagnate at about 14 per cent (IBRD and IDA, (2017). There is need therefore to: Decrease cost of finance; expand cross-border trade; streamline policy; enhance institutional support the manufacturing sector; facilitate flow of skills, technology, and information among firms; ensure fiscal stability and; boost firm-level productivity to help the sector achieve its competitive potential (World Bank – IBRD & IDA, (2017). In this regard, therefore, the influence of AF for SMEs on SMEs efficiency is vital. Alternative finance will help increase competitiveness of the manufacturing sector to increase economic growth, exports and jobs creation (World Bank - IBRD, IDA, 2017; 2015; 2013; KIPPRA, 2013).

1.2.5 Kenya Association of Manufacturers (KAM)

Kenya Association of Manufacturers (KAM) established in 1959 is a world class representative organization which pursues policy advocacy with a vision to promote

competitive local manufacturing in a liberalized market. Inspiring global competitiveness, KAM facilitates, enables, supports and develops sector-based programs focused on policy development and advocacy, training and capability development, business incubation and access to financial services and access to local, regional and global markets (KAM, 2008; 2014).

European Integration Studies (2005), found out that to prosper, SMEs need: A conducive business environment and regulations; adequate basic infrastructure services; access to short and long-term funding at reasonable rates, equity and venture capital; advisory assistance, and knowledge about market opportunities. KAM promises all these in one basket. For example, KAM corporates with MESPT (Micro Enterprises Support Program Trust), an initiative by Kenyan government in collaboration with the Royal Danish Embassy, to: Offer loans to intermediaries for on-lending to SME enterprise members; offer business development services; support agriculture and natural resource development (Rachel, 2010) It also offers institutional support and capacity building to SMEs (KAM, 2015).

Pursuing advocacy, KAM supports formulation, enactment and administration of comprehensive industry policies. Such policies help improve the manufacturing environment and, reduces cost of doing business. They generally support the pursuit of world class competitiveness (Minayo, 2014).

Pursuing excellence and global competitiveness, KAM operates a manufacturing academy where SMEs benefit from an SME-tailor-made program which provide specialised/technical, management trainings for chief executive officers and top management, shop-level and mid-level officers. The association advocates for human rights, improving the environment, integrity and anti-corruption. Kenya Association of Manufacturers also provides a framework within which member firms can fight

corruption and support community-based activities. To date, ninety-four member-firms have signed to abide to the framework and report to stakeholders annually, on anti-corruption action taken (KAM, 2015).

Pursuant to their liberalised markets agenda, KAM designed and runs the Business Growth Program (BGP) which is intended to equip member SMEs with requisite management systems and processes to propel SMEs to diversify and grow. Corroborating with Global Compact Network Kenya (GCNK) a non-governmental organization, KAM also runs a mentorship program where participants are attached to a mentor for a time (KAM, 2014-15). The same collaboration has recently facilitated the development and launch of a code of ethics for businesses in Kenya. This endeavour goes a long way to help SMEs become globally recognized for their stand for proper financial management, best business and manufacturing practices and best approaches in managing emerging business risk.

1.3 Statement of the Problem

Globally, SMEs have unique financial challenges in that they lack capacity to meet stringent lender requirements such as collateral, guarantors, audited financial statements and history of a stable income (Erick, 2014; Manasseh, 2007). These challenges are more pronounced in developing countries like Kenya (Abdulsaleh & Worthington, 2013; Jasra et al., 2011; Kihimbo et al., 2012; Nangoli et al., 2013).

While SMEs remain the core engine to development and economic growth globally, Abdulsaleh and Worthington (2013), recent increased momentum of economic growth exacerbates credit services, necessitating Alternative Finance (AF). Researching on SMEs challenges in Kenya, Ayyagari et al., (2007) identified lack of access to credit

as one of the major challenges. Studies and reports by KNBS (2017) and WBG - IBRD and IDA (2014) concur.

The operational characteristics - efficiency nexus has received extensive scholarly attention globally, accumulating a wealth of knowledge (Mwangi, 2014; Purwanto, Manongga, and Pakereng, 2014; Ruirie, 2012; Unlucan, 2010). However, scholarly endeavours to explore the impact of alternative finance on operational characteristics - efficiency nexus has received little attention, more so for small and medium-size enterprises (SMEs) in the manufacturing sector.

To counter this conundrum, a closer study of AF for SMEs is vital, to help close the credit gap. The purpose of this study was to explore the influence of alternative finance on the relationship between operational characteristics and efficiency of SMEs in the manufacturing sector in Kenya.

1.4 Research Objectives

The study's research objectives compose of a general objective, which is further divided into specific objectives.

1.4.1 General Objective

The main objective of the study was to establish the influence of alternative financing on the relationship between operational characteristics and efficiency of small and medium enterprises in Kenya.

1.4.2 Specific Objectives

Specific objectives that guided this study were:

- i. To evaluate the operational efficiency of SMEs in the manufacturing sector in Kenya

- ii. To determine whether SME size influences their efficiency in the manufacturing sector in Kenya
- iii. To establish whether SME age Influences their efficiency in the manufacturing sector in Kenya
- iv. To find out how managerial competency influences efficiency of SMEs in the manufacturing sector in Kenya
- v. To evaluate the moderating influence of alternative finance on the relationship between characteristics and efficiency of SMEs in the manufacturing sector in Kenya.

1.4.3 Research Hypothesis

The study was guided by the following null hypotheses:

- H₀₁: Evaluate the operational efficiency of SMEs in the manufacturing sector in Kenya,
- H₀₂: Size has no significant influence on efficiency of SMEs in Kenya,
- H₀₃: Age has no significant influence on efficiency of SMEs in Kenya,
- H₀₄: Managerial competency has no significant influence on efficiency of SMEs in Kenya,
- H₀₅: Alternative finance has no significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya.

1.5 Significance of the Study

Small and medium-size enterprises remain the core engine to development and economic growth locally and globally (APO, 2015; Abdulsaleh & Worthington, 2013; IFC, 2010). They incubate innovations, value addition and create employment, providing streams of income in households and support national and regional econo-

mies. Their survival and sustainability is emerging as an area of tremendous interest to policy makers, academicians, and managers/owners (Mburiah, 2017; Mburiah et al., (2016); Abdulsaleh & Worthington, 2013; Ayyagari et al., 2007). This scenario is more pronounced on credit provision and alternative finance (Nangoli et al., 2013; Kihimbo et al., 2012; Jasra et al., 2011; Allen et al., 2012; Bowen et al., 2009; Zhou & Wit, 2009).

Empirically, alternative finance (AF) accounts for the bigger percentage of finance in SMEs. Alternative finance played a pivotal role in increasing the fortunes of most leading economies like China. The researcher believes that AF holds the key to financial breakthrough for SMEs globally. Therefore, this study is of great significance to manager/owner of SMEs, who will hence be able to identify and apply vital linkages of AF and efficiency for SME sustainability.

The study will provide insights into credit maladies impacting SMEs and will therefore be useful to governments, regulatory bodies, central banks and businesses to facilitate, formalize, expand and standardize the alternative finance market in the long term, formulating policies geared towards sustaining and propelling SMEs to greater success. Stakeholders such as manufacturing sector, KAM and other representative organizations, banks & non-bank financial institution and NGOs will use this study to better understand the operations and performance of SMEs in the manufacturing sector, providing an impetus for meaningful networks. Paying attention to vital implementation aspects to benefit the manufacturing SMEs as well as representative welfare organizations.

It will assist both prospective and existing SMEs owners in understanding critical linkages among characteristics, and efficiency that would guide the decision process that enhance SME efficiency. Further, knowledge on the moderating impact of AF

will also be vital to owners, banking and mortgage institutions, who would need to determine how to mitigate the adverse factors that act as a deterrent to many prospective SMEs owners and create new products to spur SMEs growth. The study underscores the need for SMEs to merge for size as well as to belong to welfare associations for financial advocacy and homogeneity. Finally, the study provides important insights to academic researchers enriching academic discourse on theories, concepts, findings and opening new areas for research.

1.6 Scope of the Study

The focus of the study was enhancing financing of SMEs to spur economic growth in Kenya, a middle-income country in Africa. The Unit of analysis was the SME. The study did an in-depth analysis of manufacturing SMEs registered with KAM. The study was limited to KAM member organizations as target group, which are basically in the manufacturing industry. Scope included the interplay of AF of SMEs in relation to their effect on the relationship between firm characteristics and SME efficiency.

The study used cross-sectional data covering the period 2012 to 2016.

1.7 Limitation of the Study

First, this study used a cross-sectional, descriptive study design. While this approach has numerous advantages such as low cost, useful results that establish not only existence or otherwise of relationships but also the direction of relationship among variables, a limitation lie in the fact that this approach cannot determine causality. In mitigation, advantages far outweigh this disadvantage. Further, the study proposes a separate study, to pursue determination of causality. Second, DEA uses the law of relativity, employing a frontier approach in a cross-sectional approach, unable to leap benefits of a more detailed econometric function approach.

Such would require series or panel data, and enormous extra resources. Finally, DEA presumes homogeneity of product as well as of treatment of costs, a limitation lies in that even though treatment of costs may be homogenous, not so the products of SMEs. In mitigation, the study dwells on manufacturing SMEs, more so, members of an advocacy trade organization (KAM) This way, the study can claim a fair degree of homogeneity of AF products for its members and homogeneity of treatment of costs, though loosely.

1.8 Definition of Key Operational Terms

Key operational terms used in the study are defined and their application in the study is explained.

Alternative Finance (AF)

According to Baeck et al. (2014), Alternative Finance (AF) refers to the following forms of raising funds: Peer to peer Business lending, Donation Based crowd funding, invoice trading, peer to peer consumer lending, community shares, Equity-based crowd-funding/Venture capital, reward-based crowd-funding, pension-led funding and debt-based securities. Many authors such as Beck, Demirguc-Kunt, Laeven and Maksimovic, (2005; 2008) and Allen et al., (2011) view AF as the receipt of funds from non- bank and market sources.

Allen et al. (2011) simplifies the term and denotes it as borrowing of funds anywhere else other than from formal financial markets or banks. For purposes of simplicity and understanding this study adopted Allen's et al. (2011) definition of AF. Although Erick (2014) gives some examples of AF, (retained earnings, promissory-notes, bills of exchange, trade credit, invoice trading, accruals & factoring), a more inclusive list of possible alternative financing modes (AF) is as shown in Appendix 3 (II).

Efficiency

Efficiency can be defined as the demand that the desired goals are achieved with the minimum use of available resources (Martic, Marina & Baggio, 2009). According to Charnes, Cooper and Rhodes (1978), efficiency is the attainment of an optimal input versus output ratio or is the ratio of actual versus expected. Both writers appreciate that efficiency is a relative measure of performance and either or both may be applicable in this research. Efficiency is the Ratio of useful output to total input, unlike effectiveness, it is measurable.

Hena (2015) an author from India defines efficiency thus, 'bringing out the maximum results with minimum resources and minimum time.' She suggests different dimensions of efficiency in her book 'Beyond the Sky: Efficiency Redefined' (Hena, 2015). This study pursued economic efficiency as opposed to technical efficiency. Largely because the research is narrowed to the input-output dimension of efficiency and not the technological advancement dimensions.

Financial Inclusion (FI)

The Rangarajan Committee (2008) defines financial inclusion as the process of ensuring access to financial services, timely and adequate credit where needed by vulnerable groups such as the weaker sections and low-income groups at an affordable cost. Rakesh (2006_a) defines FI as a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy, while Kiai, Ng'ang'a, Kiragu and Kinyanjui, (2016) concurs. These definitions fail to include the legal person. For purposes of this research thesis, FI is defined as a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy including persons and enterprises. Since most scholars' use banking services analogous to FI, this study adopted the same stance.

Formal Financial Markets

A formal financial market is a regulated marketplace (e.g. a stock exchange) where people trade financial securities, commodities and value at low transaction costs, where forces of supply and demand determine the price. Financial markets offer intermediation services as well as other financial functions (Scholtens & Wensveen, 2003). Components of financial markets based on market levels consist of primary and secondary markets. Components of financial markets based on security type compose of money market, capital market derivative market, financial services market, depository market and non-depository markets.

Manufacturing Enterprises (ME)

Agus and Abdullah (2010), described the manufacturing industry as that which comprise of processing of raw materials, assembling products parts and repairing of manufactured products. On the other hand, KIRDI (1993), described it as that compartment of the economy which is concerned with production or making of finished goods from raw materials by means of an elaborate and organized system of labour under single control, especially with the aid of machinery.

Wanjau (2010) gives a concise view, thus “any enterprise that changes the form of any raw material to a consumable product through a process before selling to the customer is considered a manufacturing enterprise”. However, in this study, manufacturing industry is any industry that makes products from raw materials using manual labour or machinery and that is usually carried out systematically with a division of labour (Britannica, 2015). These include enterprises like those listed in the KAM directory (KAM, 2014).

SMEs – Small and Medium-Size Enterprises

The European Union (EU) define SME as "The category of micro, small and medium-sized enterprises (SMEs) made up of enterprises which employ fewer than 250 persons and has an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro" (European Commission, 2011; EIS, 2005).

Most scholarly publications appear to prefer the use of Small and Medium-sized Enterprises (SME), examples are; Wanjau (2010), Dojkovski, Lichtenstein and Warren, (2007); EIS, (2005); and international organizations such as EU, WBG, UN and WTO. However, their definitions in regard to size classification vary within economic regions and across countries, relative to the size of the economy and its endowments.

This study adopted the KAM classification as per appendix 5 - Classification of SMEs in Kenya – KAM, where it took cognizance of the size of the economy and relative economic endowments of the African region (KAM, 2014). Therefore, the operational definition of SMEs will include micro, small and medium enterprises, with turnover range of between 0 and 100m and employees between 1 and 250.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical look at theoretical and empirical literature in SME financial needs, SME characteristics, alternative finance, and efficiency. The study was guided by general financial markets and firm financial needs concepts, theories and models, to provide clarity of the study perspective. A conceptual framework explaining the relationships among SME characteristics, alternative finance and efficiency of small and medium-size enterprises in the manufacturing sector in Kenya was also developed.

2.2 Firm Characteristics

Concepts and constructs are used at theoretical level as variables are used at empirical level (Neuman, 2003). Therefore, theories are generalizations about variables and relationships among them. Degryse, De Goeij and Kappert (2012) concept of the impact of firm and industry characteristics on small firms' capital structure indicate that their capital structure decisions are consistent with the pecking order theory as did Myers and Majluf (1984) and Psillaki (2008). Therefore, SMEs use their profits to reduce their debt level while growing firms increase their debt position for they need more funds.

On the other hand, industries exhibit different average debt levels in line with the trade-off theory, the basis for the static trade off theory, Baker and Martin (2011); Jahanzeb, Rehman, Bajuri, Karami and Ahmadimousaab, (2014), the pecking order theory, Ishaque and Jalal (2007); Jahanzeb et al. (2014); Myers and Majlu, (1984); as

well as the market timing theory, Baker and Wurgler (2002) and Degryse et al. (2012). These theories and concepts analyse how debt may be used to maximize the value of a firm. They also address other ways through which debt can influence a firm's value such as agency costs and asymmetric information among others. The fear of loss of ownership in a firm is used to show why firms would only issue equity as a last resort to raise funds (Jahanzeb et al., 2014).

According to Brigham and Houston (2009; 2011), transaction costs incurred in raising equity and debt matter when deciding whether to use debt or equity. The study results showed that debt transaction costs are less, compared to those of equity. Also, the market costs incurred when issuing debt are lower than those of issuing equity. For this reason, debt financing would be more appealing to a manager than equity financing (Brigham & Houston, 2009, 2011).

Recent developments on these concepts such as Market timing theory propose that use of equity and debt will depend on the prevailing market conditions with respect to returns on equity (Baker & Wurgler, 2002). Propositions by Wentges and Gossy (2010) dictate that share issuance for a period of more than one year has the ability of affecting a firm's capital structure. This has, however, been disputed by a number of authors such as (Zopounidis & Pardalos, 2010).

2.3 Firm Financial Services Sources

Firms may access financial services from formal or informal financial markets. Small and medium-size firms require services of financial markets as does large firms. While the owner/manager acts on behalf of the SME, the entrepreneur accesses the financial market, at times as lenders when they have excess liquidity and as borrowers during times of financial needs. Strategic entrepreneurs employ their entrepreneurship

and strategic management skills to juggle SMEs factors of production to create wealth through skilful financial management.

A formal financial market is a regulated marketplace (e.g. a stock exchange) where people trade financial securities, commodities and value at low transaction costs, where forces of supply and demand determine the price. Financial markets offer intermediation services as well as other financial functions. Components of financial markets based on market levels consist of primary and secondary markets. Components of financial markets based on security type compose of money market, capital market, derivative market, financial services market, depository market and non-depository markets (Andries & Cuza, 2009).

The theory of financial intermediation presumes formal finance (Rangarajan Committee, 2008). Further, contemporary financial intermediation theory hinges on the concept that intermediaries serve to reduce transaction costs and informational asymmetries using the formal banking institutions. However, informal intermediation is inevitable to bring financial services to persons and institutions. The financial inclusion concept, according to the Rangarajan Committee (2008), pursues to ensure timely access to affordable financial services such as credit for all, Rakesh, (2006_a) Kiai et al., (2016), including the legal person, more so the SMEs. These pursuits need not be fundamentally formal but would inevitably include alternative finance sources.

Informal financial markets are none regulated marketplaces that may trade in some forms of financial securities, commodities and even value but at fluctuating transaction costs and forces of supply and demand may not determine the price due to information opacity. Informal financial markets may offer intermediation as well as financial functions. They are neither segmented at market levels nor are their security types distinct, owing to lack of regulation and opacity.

Some Informal financial markets products include accruals and debt-based securities, bills of exchange, business angel financing, factoring, hire purchase, invoice trading, lease finance, loans from family members, loans from microfinance institutions, peer to peer consumer lending, peer to peer lending, personal savings, promissory-notes, retained earnings, SACCO loans, table banking services, trade credit, and venture capital.

2.4 Relationship between Organization Characteristics and Efficiency

Virtually all recent reviewed literature such as Purwanto et al. (2014); Mwangi (2014); Ruirie (2012); Unlucan (2010); IFC (2010) and USITC (2010) point to a positive relationship between firm/organization characteristics and efficiency. Most of them also point to a causal relationship between characteristics and efficiency. However, Esho (2001) found a negative relationship between organization characteristics and efficiency for Australian organizations. Similarly, Crapp (1983) found a negative efficiency-size relationship for US firms. Fried et al. (1993) found no relationship between size and efficiency for US organizations.

Unlucan (2010), in their study on SME characteristic-efficiency relationship says that SMEs are characterized by number of employees; sales volume; unique product; innovation; better and more complete customer service; new job creation; flexibility, day to day operational activities and limited resources in form of capital humans and time.

Unlucan (2010) contend that for an SME to survive, it must consider owners level of education and training, personal abilities and characteristics. That study concluded that SME characteristics impact on SMEs efficiency, (Unlucan, 2010). According to

Ruirie (2010; 2012), financial factors such as finance costs, manufacturing costs, business skills, and political instability strongly impact manufacturing SMEs' growth.

2.5 Theoretical Orientation

Concepts and constructs are used at theoretical level as variables are used at empirical level, Neuman (2003), thus theories are generalizations about variables and relationships among them. This section provides the theories relevant to the study.

2.5.1 Financial Intermediation Theory (FIT)

Financial intermediation theory is an off-shoot of the loanable funds theory, which concerns market interest rates for loanable funds determined by free market forces (Robertson, 1934). This theory integrates bank credit into the initial savings/investment equilibrium Ohlin (1937), thereby distinguishing it from classical interest theory which determines interest rates by savings and investment only. The loanable funds market is a hypothetical market that brings savers and borrowers together, also bringing together the money available in commercial banks and lending institutions available for firms and households to finance investments or/and consumption.

Loanable funds are often used to invest in new capital goods, therefore, the demand and supply of capital is usually discussed in terms of the demand and supply of loanable funds (McConnell & Blue, 2005). Since the quality of small firms' financial statements vary, small firms usually have higher levels of asymmetric information. When issuing new capital, the cost is high, but for internal funds, costs can be considered to be zero. For debt, the costs are in an intermediate position between equity and internal funds (Frank & Goyal, 2005). As a result, firms prefer a pecking order of in-

ternal financing, then debt financing and only call in equity as a last resort, a position this study supports and demonstrates.

Current financial intermediation theory builds on the notion that intermediaries serve to reduce transaction costs and informational asymmetries. The role of financial intermediation in economic growth has been widely recognized in theoretical and empirical research. However, many of the researchers investigating the relationship between finance and growth mainly concentrate on financial depth indicators, leaving the area of alternative finance (Yusifzada & Mammadova, 2015).

Finance can stimulate the main drivers of growth such as capital and total factor productivity. Financial intermediaries decrease transaction costs of capital accumulation, liquidity provision, debt renegotiation, information provision and encourage savings. According to Yusifzada and Mammadova (2015), financial depth does not fully reflect how well the financial intermediaries serve the economic agents in stimulating economic growth. Additional aspects of financial systems such as access, efficiency and stability must be considered to illuminate the relationship between finance and economic growth.

Financial intermediation is the transfer of funds from those economic entities with surplus to those with deficit (Andries & Cuza, 2009). Financial intermediaries are institutions that mediate between the providers and users of funds. FIT advocates for the existence of financial intermediaries based on: Existence of information asymmetry; high transaction costs; and existing financial regulations (Allen & Santomero, 1997; Andries & Cuza, 2009).

First, FIT argues that informational asymmetry between economic entities with surplus and those with deficit funds generates imperfections in the market. Further, fi-

nancial institutions, through screening, help reduce adverse selection. They further put in place debtor monitoring mechanisms to deal with the moral hazard aspect of information asymmetry (Andries & Cuza, 2009).

Second, in the argument of transaction costs, FIT poses that financial institutions, by exploiting economies of scale, can reduce the aggregate transaction costs that would be incurred if economic entities were to transact directly with one another. These costs include those that would be incurred in parties searching for one another, selection and monitoring, asset maturity transformation, provision of liquidity, and asset diversification (Andries & Cuza, 2009).

Third, FITs' argument hinges on the method of regulation adopted to govern saving and financing in an economy. Regulation reduces the degrees of freedom of financial institutions about what they may or may not do. Consider regulations requiring the financial intermediaries to maintain liquidity levels exceeding specified thresholds and not exceed prescribed deposit to capital ratios, for an example (Andries & Cuza, 2009).

FIT aids in understanding the nature of FI and its impact on the relationship between efficiency and characteristics. The information asymmetry aspect of the theory would suggest that more of the alternative sources are likely to be used and hence higher efficiency of the SME, relative to its size. However, where solutions to information asymmetry may be found, the risk of adverse selection and that of the moral hazard would reduce, thereby reducing cost of funds.

Eventually, use of AF and formal finance would stabilize at par, other factors held constant. The transaction cost dimension would impact moderating variables positively, presumably causing a ripple effect on the characteristics and (increase in size, age,

more adoption of technology and higher managerial competency) all lead to higher efficiency of SMEs (Andries & Cuza, 2009).

Present financial intermediation theory shapes on the idea that intermediaries serve to reduce transaction costs and eliminate informational asymmetries (Diamond, 1984). As developments in information technology, deregulation and deepening of financial markets, among others tend to reduce transaction costs and informational asymmetries, financial intermediation theory shall conclude that intermediation becomes useless. This contrasts with the practitioner's view of financial intermediation as a value-creating economic process. It also conflicts with the continuing and increasing economic importance of financial intermediaries (Scholtens & Wensveen, 2003). From this conundrum, this study concludes that current financial intermediation theory fails to provide a satisfactory understanding of the existence of financial intermediaries.

Many of these imperfections generated by informational asymmetry to the financial intermediaries lead to the emergence of some specific forms of transaction costs. The studies regarding informational asymmetry approach especially the problem of relationships between bank and creditors, respectively bank and debtors. In the relationship between bank and borrower, the main aspect analysed is the function of the selection bank and the tracking of the granted loans, as well as the problem of adverse selection and moral hazard (Marius, 2009). In the relationship between bank and depositors (creditors) a special attention is given to the factors that determine depositors to withdraw their money before due date.

2.5.2 Theory of the Firm

Theory of the firm consists of several economic theories. Theory of the firm is that branch of economic theory which endeavours to determine the important economic

variables associated with the individual business unit, such as price, output and growth. It is concerned with the macroeconomic concept which argue that firms exist and make decisions and models to maximize profits. It is based on neoclassical economics whose theory pegs on a proposal that a firms' economic growth rate may be sustained by the ideal proportions of three driving forces, labour, capital and technology.

Theory of the firm endeavours to explain and predict the nature of the firm in relation to its reason for existence, behaviour, structure and relationship to the market (Coase, 1937). The question of the heterogenous nature of firm performances and what drives firm performance is key here. Further, under the theory of the firm, the neoclassical theory of the firm states that firms exist and make decisions to maximize profits while the Baumol's cash management model helps in determining a firm's optimal cash balance under conditions of certainty.

Baumols argument is that cash and inventory management problems are one and the same thing. However initial traditional theory of the firm studied supply of goods by profit-maximising agents. Here, production costs played an important role. Coase (1937), however, pointed out that in addition, transaction costs are also vital in explaining a firm. This study delves into the question if certain SME characteristics drive its efficiency and specifically, whether alternative finance has a moderating effect of such relationship. This theory impacts cost of capital in determining efficiency, the dependent variable of this study.

That SMEs economic growth rate may well be determined by the proportions of major driving forces; labour, capital and technology, depending on how they are financed. If less costly AF is used compared to more expensive sources, then the economic growth rate of the SMEs will be higher and vice versa. It is important for this

study to find out if those firms that employ more alternative finance end up more efficient than those which employ less of alternative finance. The theory of the firm therefore brings in a vital concept for consideration in this study.

2.5.3 Resource Based Theory

The resource-based view (RBV) is a managerial framework used to determine the strategic resources with the potential to deliver competitive advantage to a firm. Competitive advantage is the attribute that allows an organization to outperform its competitors (Porter, 1985). These resources may be exploited by the firm to achieve sustainable competitive advantage. Opposed to the input/output model, the RBV holds the perspective that a firm's internal environment in terms of its resources and capabilities is more critical to the determination of strategic actions than its external environment. Barney's article "firm resource and sustained competitive advantage" pivoted this theory to the limelight, earlier works in the same area notwithstanding (Barney, 1991).

The RBV is based on the concept of economic rent and the view of the company as a collection of tangible and intangible capabilities (Prahalad & Hamel, 2009). Prahalad and Hamel (2009) and Peng (2006) argue that firm-specific resources and capabilities largely differentiate successful firms from declining firms. Since not all resources of a firm have strategic potential to be the basis of a firm's competitive advantage, those unique resources and capabilities that are valuable, rare, costly to imitate, and not substitutable make it to this vital category (Peng, 2006; Hitt, Ireland & Sirmon, 2009; Barney, 2001).

A firm's unique resources and capabilities can be viewed as tangible and intangible resources or assets. Tangible resources are assets that can be seen and quantified,

broadly organized into financial, organizational, physical, and technological. On the other hand, intangible resources may include human, innovation reputation or goodwill and capability. Capability refers to a firm's potential to deploy its resources, usually in combinations, using organizational processes to arrive at a desired ending (Wernerfelt, 1984).

Clearly, the RBV underscores the vital position of finance, managerial entrepreneurial orientation and innovativeness as unique resources and capabilities which when skillfully organized are capable of transforming manufacturing SMEs into efficient, competitive and successful firms. The RBV suggests that a firm's unique resources and capabilities will provide the basis for a business strategy (Barney, 1986). The strategies chosen should enable the firms to best exploit its core competencies relative to opportunities in the external environment.

One of the strands of RBV is the theory of the growth of the firm by Penrose (1959). The theory differentiates between resources and services they render. Resources can provide a variety of productive services. In turn, the provision of these services can modify the attributes of the resources and enable the provision of new services. This way, the firm is considered as a collection of productive resources the disposal of which between different uses and over time is determined by administrative decisions (Penrose, 1959).

The fact that there is heterogeneity rather than homogeneity of both human and material productive services implies that the firms are unique. Further, the ability of resources to produce a variety of services which can modify the attributes of the resources and enable provision of new services points to the moderating capacity of some of the resources at the disposal of a firm. This is a key aspect of this study.

In the years after 1992, Penrose's contribution and the resource-based view have acquired huge recognition, arguably challenging transaction costs as the leading economics-based theory of the firm. For Penrose, moreover, one cannot even start analysing the external environment of the firm without basic understanding of the nature of the firm, made up of its human and non-human resources and their varying interactions. In this theory, emphasis is on the internal resources of the firm. To recognize the reasons for the growth of the firm, we must consider the whole organization.

According to Penrose (1959), motivation to innovation is the focus on the analysis of the expression of the innovating multi-product, fresh and blood, organizations that businessmen call firms, not on optimal price/output equilibrium of neo-classical theory. Such firms consist of both human and non-human resources, under administrative authoritative co-ordination and communication, human and especially managerial resources are most important. Resources can provide multiple services. Firms use their resources to perform activities that result in products for sale in the market for profit. Firms differ from markets, their boundaries defined by the reach of authoritative co-ordination and communication.

Due to resource indivisibility and the balance of processes, firms will always have excess resources. Moreover, the very performance of activities within firms creates new knowledge through specialization, division of labour, resource combination, teamwork, and learning. This reduces the time required for the implementation of current activities, thus generating further excess resources, which are not fully utilized at any given point in time.

According to theory on the dynamics of early growth, very new firms are subject to high infant mortality and their survival chances increase as they age. While for a whole cohort of firms the proportion continuing to grow falls over time as events take

their course. Theory and evidence suggest that no more than half of cohort of new firms will grow to the point of achieving self-sufficiency, at most a quarter will expand beyond the plateau stage and among these, few will be unable to sustain their growth performance or recover from reversal following early expansion. It is to be expected that under five percent of the cohort will experience the sustained growth amplification effect required if they are to become major players in the industry (Stokey, 1994). Never the less, surviving firms may grow sufficiently to capture increasing market share.

This theory is important to this study because alternative finance, the moderating variable and firm characteristics, the independent variables are hypothesized as vital to a firm's attainment of efficiency and eventual competitive advantage and growth (Laugen, Acur, & Frick, 2008). Therefore, this study was on the lookout for firms which are not keen on how alternative finance impacts their farm characteristics and manage such impacts will achieve decimal efficiency and therefore stagnate.

On the other hand, SMEs which take a keen look to identify their key characteristics such as size, age and managerial competency and how they impact their efficiency, develop an edge over competition and keep ahead will emerge. Further, SMEs managers/owners who go a step further to determine unique capabilities of some of the resources, such as their moderating impacts on characteristics will gain greater efficiency momentum when they use this moderating impact well.

Therefore, innovative owners/managers will demonstrate use of their entrepreneurial orientation to initially classify hierarchically, vital resources of the firm. Further, they will identify capabilities to exploit such tangible and intangible resources in the right proportions. Also, they will work on its internal environment in terms of its resources

and capabilities which is more critical initially to the determination of strategic actions and eventually its gaining a competitive advantage.

It would be important for this study to find out if RBV may provide a managerial framework to determine the strategic resources with the potential to deliver competitive advantage to SMEs, for them to consistently outperform competitors (Porter, 1985; Barney, 2001; Peng, 2006; Hitt et al., 2009). It would emerge if this theory underscores the vital position finance, managerial innovativeness, competency and other characteristics such as size and age take in availing manufacturing SMEs a competitive edge (Laugen et al., 2008; Wernerfelt, 1984).

2.5.4 Theory of Stochastic Optimal Economic Growth

Stochastic or random growth models imply that factors of growth experience a random walk, impacting growth of the firm with equally random distributed likelihood (Olson & Roy, 2005). Olson and Roy (2004; 2005) further argue that random optimal economic growth involves the study of optimal intertemporal allocation of capital and consumption in an economy where the production process is subject to stochastic disturbances. This theory developed initially from the pivotal work on deterministic optimal growth by Ramsey (1928); Cass (1965) and Koopmans (1965). The Stochastic optimal economic growth model is useful both as a normative exercise as well as a cornerstone in the development of positive theories on how the economy works (Brock, 1979; 1982; Mburiah, 2017; Mburiah et al., 2016). The theory is a central paradigm of dynamic economics.

The theory poses three basic questions: What are the characteristics and determinants of optimal policies? What are the economic incentives that govern the optimal intertemporal allocation of resources? What is the transient and long-run behaviour of var-

iables in the model? (Olson & Roy, 2005). Its primary variable is capital in its diverse forms and classifications, alternative finance being a vital aspect. The model has diverse strands with application in variety of economic problems such as the study of business cycles and assets pricing.

One of the model strands of Stochastic optimal economic growth by Gibrat (1931) postulates that firm growth is independent of firm size. Further, that firms, regardless of their size are availed a similar probability distribution of growth rates. Lucky firms grow faster while unlucky ones grow slowly. The theory explains why firms in the same industry are more competitive than others. However, this theory does overlook the human aspect of the manager/owner, such as managerial competencies and risk attitude, as though they have no impact on the growth rate of the firm.

Further, firm-size dispersion increases over time, such that market concentration is higher if the number of firms remains the same. The theory endeavours to interrogate the dynamics of capital, characteristics and performance of the firm, which is the main thrust of this study. The theory introduces an important concept to this study. This study has firm size as one of the independent variables. The study hypothesizes that SME size impacts efficiency, thereby refuting one of the model strands of Stochastic optimal economic growth theory by Gibrat (1931), which postulates that firm growth is independent of firm size.

Where SME size is found to be a significant predictor of efficiency of firms, then the contention of the theory on size irrelevance on growth will have failed. Further, if the moderating influence of alternative finance on size – efficiency relationship, is proven, then the contention of the theory on size irrelevance will have failed. This vital aspect of demonstrating the relevance or otherwise of size as a factor for growth renders the theory of stochastic optimal economic growth useful for this study.

2.5.5 Schumpeter Theory of Innovation

The theory of economic innovation and business cycle, according to Schumpeter, the "gale of creative destruction" is the industrial mutation process that destroys and re-configures previous economic orders and clear the ground for the creation of new wealth. Schumpeter (1994; 1942), innovation economics theory emphasizes entrepreneurship and innovation including innovative financial models. This theory emphasizes that the two-pronged thrust that while innovation drives the economic policy of a firm, reliance by markets on mere inputs resources and awaiting market price signals will not necessarily enhance economic growth (Schumpeter, 1994; 1942).

Innovative business minded people help germinate microenterprises and transit them to SMEs and beyond by use of their innovation, skills and business acumen. Schumpeter views entrepreneurship as innovation and not imitation. Schumpeter's innovator is an economic and social leader who does not mind much about economic profits but only the joy one derives from being an innovator and being of service to society. In the Schumpeterian theory, the entrepreneur innovator moves the economy out of static equilibrium by use of innovative skills (Schumpeter, 1942). March (1991), posits that Schumpeter does not deny that the process of accumulation is the ladder to social power and social prestige.

Schumpeter thought that the very mainspring of the exercise of the entrepreneurial function is the willpower to assert economic leadership (Bula, 2012). The entrepreneur reactivated the economic system out of static equilibrium through creation of new products and or new production methods, rendering some of the existing products obsolete, a process referred to as creative destruction. Schumpeter viewed this creation of uncertainty as the driving force for economic development (Schumpeter, 1942).

In his theory on innovation, Schumpeter (1934) claims that, an entrepreneurial firm is one which combines various input factors to generate value that exceeds the cost of input factors for profit (Bula, 2012). This theory is useful in this study because it demonstrates that firms attain a competitive advantage and improve efficiency if their owners and managers are innovative, skilful and informed (Uzkurt, Kumar, Kimzan & Eminoglu, 2013). To take advantage of emerging opportunities, they adjust their actions accordingly to ride the wind of change.

Owners/managers of firms need to constantly rethink and renew the present innovatively (Brown, Davisson & Wiklund, 2001). However, a major shortcoming of the theory is its endeavour to ignore other resources as an imperative to organization success, since innovation alone without resources would take the firm nowhere. The fact that this theory does not capture other firm characteristics without which the firm cannot improve its efficiency, thereby limiting its success, leaves it open for criticism.

This theory is applicable to manufacturing SMEs members of KAM in Kenya, as they pursue to favourably compete in the global arena, survive and excel via superior managerial competency, skills, innovation and efficiency. The innovative skill of the owner/manager/worker sets them apart from all other factors of production, thereby holding a pivotal role in changing the fortunes of a firm. Hypothetical SMEs with same endowments safe for level of entrepreneurial innovation of owner/manager/worker would experience greater efficiency and higher profits, both in the short and long run. This study has managerial competency as one of its independent variables.

Managerial competency presents in the form of innovation, entrepreneurial orientation and level of education. It would be of interest for this study to find out how managerial competency fairs as a predictor of efficiency vis-a-viz other firm characteristics, more so when it and other characteristics are moderated by alternative finance.

If the extent to which managerial competency explains the fluctuations of efficiency as compared to other firm characteristics, then one may claim that managerial competency is a more imperative factor than the other predictor variables, thereby confirming the Schumpeterian theory of innovation. This claim would be further reinforced if the moderating effect of alternative finance on the relationship between managerial competency and efficiency is confirmed, with a higher coefficient, compared to those of other predictor variables.

2.5.6 Endogenous Growth Theory

Endogenous growth theory, according to Aghion and Howitt (1998), holds that economic growth is primarily the result of endogenous and not external sources. Investment in human capital, managerial capacity, innovation/adoption of technology, and knowledge of market are significant contributors, Romer (1994), not to mention age and size of the SME. This goes a long way to explain relationship between major factors of SME characteristics and efficiency.

These factors are: managerial capacity, innovation/adoption of technology, and knowledge of market. Human capital refers to the total labour force in a company, more so referred to as employees or workers. They provide workmanship and include foremen in a manufacturing scenario. They impact production through their level of efficiency and individual output, their level of skill and type of learning curve before they perfect proficiency of skills. Labour cost is also a factor impacting the price. The higher the output/skill/workmanship, the higher the expected economic growth. The higher the total labour cost, the lower the economic growth. The higher the ratio of output to labour costs, the higher the expected real economic growth

Managerial capacity refers to the business acumen of management/owners. This is the entrepreneurial orientation and may include innovation, adoption of technology, risk attitude, level of education and experience. The higher the managerial capacity, the more the expected economic growth of a firm. Relative to competition, the higher the level of managerial capacity of management in a firm, the more competitive it becomes.

Knowledge of market is having the expertise to evaluate the demand, the supply and other competitors in the same or other similar products and services and the psychology of the market and its political stability. Knowledge of market refers to current supply and demand trends, extent, potential number of customers, geographical spread of the market, level of differentiation, level of sophistication of customer needs, demographics and statistics of its history that a firm has. Generally, the higher the knowledge of the market, the higher the expected economic growth for the firm. The higher the knowledge of the market for the firm relative to competition, the higher the competitive edge the firm has.

This study has adopted endogenous sources, Aghion and Howitt (1998), particularly investment in managerial capacity as measured by level of innovation/adoption of technology, level of education and experience. Another significant dimension is that of human capital a major component of production, for it impacts quality, cost and price of products, ultimately impacting efficiency. It interests this study how managerial competency impacts efficiency. The study hypothesized that higher managerial competency would drive efficiency higher. Further, better human capital leads to higher relative efficiency. The study also viewed this interplay from the perspective of its moderation by alternative finance. These dimensions pronounce the endogenous growth theory is imperative to the study.

2.6 Conceptual Framework

According to Kiai (2016); Kombo and Tromp (2009); Miles and Huberman (1994), a concept is an idea inferred from instances specific. A conceptual framework (CF) consists of broad ideas and principles from a relevant field of enquiry. For this study as is in Mburiah (2017); Mburiah et al. (2016), a CF is a theoretical structure of assumptions, principles and rules that hold together the ideas comprising a broad concept. A CF helps the study to convey awareness and understanding of the area under study. It depicts and explains the various interactions between and among variables of the study.

For this study, the conceptual framework illustrates the various interactions between and among independent, moderating, and dependent variables. The independent variable is the SME characteristics. The dependent variable is efficiency of SME while AF is the moderating variable. This framework is drawn considering the logical relationships of the variables, from the literature review arguments and the theoretical framework.

In the financial intermediation theory, the transaction cost dimension is anticipated to impact the moderating variables positively. In the theory of the firm, it is important for this study to find out if those firms that employ more alternative finance end up more efficient than those which employ less of alternative finance. In the resource-based theory, the moderating variable and firm characteristics are viewed as unique resources to the SME, capable of transforming manufacturing SMEs into competitive and efficient firms. In the Theory of Stochastic Optimal Economic Growth, seeking firm characteristics and determinants of optimal policies, Gibrat (1931) contention that firm growth is independent on firm size was in question. For the Schumpeter Theory of Innovation brings the managerial competency into focus, in this study. In

the Endogenous Growth Theory, the study pursues the interplay of endogenous managerial competency and endogenous alternative finance. The pecking order theory has been used to arrive at AF as the moderating variable of choice. Specifically, AF is less costly compared to formal finance and would be used or called into play first.

The conceptual framework is depicted in Figure 2.1, with the inter-relationships among the variables envisaged to be as follows: As shown in Table 2.1, it is expected that SME characteristics which is the independent variables exemplified by size, age, and managerial competency, influence the performance of the SME. Specifically, it is expected that higher SME efficiencies are associated with higher size of SME, higher ages and greater managerial competency. This shows the logical link between the independent and dependent variables.

The independent-dependent variables relationship is influenced by the moderating variable. For instance, the expected relationship between efficiency and size is that the larger the SME, the more efficient it is. However, the strength of the relationship is such that if SMEs are stratified by level of AF, then the relationship between efficiency and size would be stronger for those SMEs whose level of AF are higher than for those whose level of AF are lower. It is also expected that the higher the AF, the stronger the relationship between each characteristic (Size, age and managerial competency) and efficiency. Hence this depicts the moderating effect of AF on the independent-dependent variables relationship.

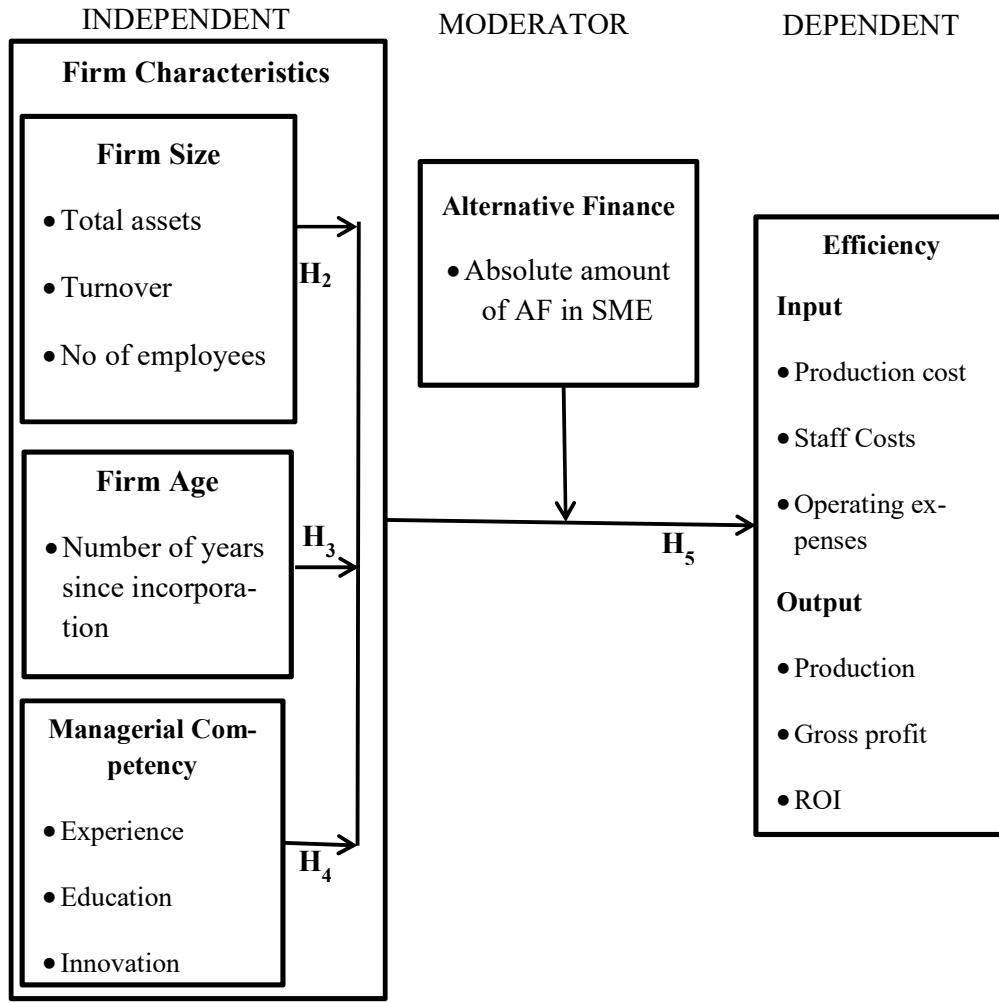


Figure 2. 1: Conceptual Framework

Relationships Between Independent and Dependent Variables

It is anticipated that: The effect of the independent variable on the dependent variable is not only direct, but also enhanced through the moderating variable. Therefore, firm size will not only influence efficiency of the SME, but also, that larger firms will be more efficient the smaller SMEs. On moderation, it is expected that SMEs with higher use of alternative finance will be more efficient than those that record lower usage of alternative finance, thereby propelling those SMEs whose size is higher to grow even more efficient.

The same scenario is expected to manifest for all the variables in the firm size construct, total assets, turnover and number of employees. Age will not only impact efficiency, but also, that older SMEs will be far more efficient than younger ones. On moderation, it is expected that SMEs with higher use of alternative finance will be more efficient than those that record lower usage of alternative finance, thereby propelling older SMEs to grow even more efficient. Managerial competency will not only impact efficiency positively but also, that those SMEs whose managers/owners have higher managerial competency will have higher efficiency. On moderation, it is expected that SMEs with higher use of alternative finance will be more efficient than those that record lower usage of alternative finance, thereby propelling those SMEs whose managers/owners have higher managerial competency to grow even more efficient.

The same scenario is expected to manifest for all the variables in the managerial competency construct, experience, education, innovation or entrepreneurial orientation. Age leads to wider SME financial coverage; managerial competency leads to more managerial innovation. Bigger size of SME will lead to bigger volumes of turnover, increasing efficiency.

The study expected that a positive relationship would be in line with the findings of Migiro (2005; 2006), who found out that interest rate and collateral requirement were the major factors influencing choice of finance. It is expected that a relationship between size and efficiency will be established. This would be in line with the findings of Musamali and Tarus (2013), who found out that firm profile such as ownership structure; size of the firm; business type; and age of the business, indeed influence SMEs' access to finance.

It is expected that a relationship between innovation, entrepreneurial orientation and decision on level of financing will be established. This would be in line with the findings of Patel and D'Souza, (2009), who found out that pro-activeness and risk-taking enhance performance. Table 2.1 depicts the relationship between the study variables and the hypotheses.

Table 2. 1: Hypotheses Classification by SMEs Characteristics, Moderating, and Combined Effects

Variables	Hypothesis – (H ₁₂)	Hypothesis as Moderated by Level of AF – H ₁₃	Operationalized Hypothesis as Moderated by Level of AF – H _{13, I}
Size (S) of SME versus Efficiency	H _{12, S} : The higher the size of SME, the higher the degree of efficiency	H _{13, S} : The higher the level of AF, the stronger the relationship between size and efficiency	H _{13, ST} : The higher the level of AF, the stronger the relationship between Assets and efficiency H _{13, SO} : The higher the level of AF, the stronger the relationship between Turnover and efficiency H _{13, SY} : The higher the level of AF, the stronger the relationship between Employees and efficiency
Age (G) of SME versus Efficiency	H _{12, G} : The older the SME the higher the efficiency	H _{13, G} : The higher the level of AF, the stronger the relationship between age and efficiency	H _{13, G} : The higher the level of AF, the stronger the relationship between age and efficiency
Managerial competency (M) versus Efficiency	H _{12, M} : The higher the competency the higher the efficiency	H _{13, M} : The higher the level of AF, the stronger the relationship between managerial competency and efficiency	H _{13, MX} : The higher the level of AF, the stronger the relationship between Experience and efficiency H _{13, MU} : The higher the level of AF, the stronger the relationship between Education and efficiency H _{13, MI} : The higher the level of AF, the stronger the relationship between Innovation and efficiency

For example, for size of SME in hypothesis H_{12, S}, the higher the size of the SME, the higher the degree of efficiency.

2.7 Efficiency of SMEs.

According to Prusa (2012), the average efficiency of manufacturing SMEs in the Czech Republic lies between 50 and 70 percent of the best sectors. The study data encompassed 30 SMEs divided into different subgroups according to the number of their

employees. Prusa (2012), proposes that an efficient measure of efficiency should include both technical and allocative efficiency. Further, he proposes that they both can be concurrently calculated using a “money- metric production” frontier framework which stipulates product heterogeneity and price endogeneity. This production frontier separates technical efficiency from allocative efficiency. The overall efficiency obtained from such a production frontier represents economic efficiency. This study is interested in the economic efficiency of SMEs in the assumption of constant technological advancements.

Efficiency of SMEs is impacted by many factors, and their “characteristics” is one of them. The relationship between efficiency and characteristics is influenced by appropriate moderating variables. In their review of literature on SME financing, Abdulsaleh and Worthington (2013), emphasize that SME access to finance is fundamental, if they are to play their role to sustain growth in the SME sector and spur innovation for national economic growth. EIS (2005) point out that sustainable SME development, influenced by efficiency, require concerted efforts among the various parties concerned, among the leading ones being local business associations (EIS, 2005).

The industry contribution to GDP has gradually declined from 21 per cent in 1980, to 19 percent in 1990, and to 17 percent by year 2000. There is need therefore, to involve local business associations in the endeavour to reverse these negative trends in the manufacturing sector as the main driver to increased economic growth.

SMEs efficiency is of importance since SMEs are the backbone of the economy in most developing and developed countries. They employ a large part of the labour force and the sector is perceived as an alternative employer. Many studies have shown that SMEs are at least as important as large firms in the creation of gross and net new jobs globally (Abdulsaleh & Worthington, 2013; Jasra et al., 2011; Kihimbo et al.,

2012). Notwithstanding their importance, most SMEs are not able to exploit the increased market opportunities. This incapacity is due to many constraints such as low productivity, incapacity to face competition from imports or in export markets, constraints to adopt new technologies and or a lack of finance (Ayyagari et al., 2007). All these constraints may be summarised into inefficiency and lack of adequate finance. Beck et al. (2010) contend that SMEs face more challenges in doing business than large enterprises because of the difficulties in financing start-up and expansion.

In majority of countries, more so in developing nations, lending to small businesses and entrepreneurs is limited. This is mainly because financial intermediaries are apprehensive about supplying credit to SMEs due to their high risk, small portfolios, and high transaction cost associated with commercial lending (Beck et al., 2010). Although AF appears to be the preferred mode of financing start-ups, IFC (2010), factors influencing this choice remain unclear.

While certain AF models showed mixed performance in different economies (Acemoglu & Johnson, 2005; ICSA Emerging Markets Committee, 2013; IFC, 2010), the search for universal solutions through research should be encouraged, with more attention being directed to developing economies, where such factors are expected to be most explicit.

Mwangi (2014) in a study sought to establish how members' income and conduct of SACCOs affects the relationship between characteristics and efficiency of SACCOs - intermediaries in Kenya. The study concluded that Characteristics (size and age) have a significant positive effect on efficiency. However, a stratification of entities falling in different member income strata, before analysing relationship between size and efficiency was likely to show improved results. Further, the measure for the bond of association and its relation to reduction of costs was not clear (Mwangi, 2014).

Purwanto et al. (2014), did a study on the efficiency of Tofu SMEs using Data Envelopment Analysis (DEA) and found causes of inefficiencies in the SMEs were gross profit per day, number of employees, the width of production place and amount of raw materials. Purwanto et al. (2014) asserted that there were milestones that SMEs needed to achieve before they could be termed as efficient and these included an improvement in the gross profit and revenue, a reduction in the amount of raw material used and reduction in the number of employees and width of production area. The mixed results on SME efficiency-characteristic relationship beg for more research in the field.

2.7.1 Approaches for Measuring Firm Efficiency

Two possible approaches may be used to measure the performance of firms (Mwangi, 2014). They are either parametric or non-parametric in nature. The parametric approaches include; deterministic frontier method, stochastic frontier approach and thick frontier approach. The non-parametric firm performance measures are data envelopment analysis (DEA), and free disposal hull (FDH) (Smith, 1997).

Performance is a key component of efficiency. The ability of SMEs to align their purposes and strategies determines their success. One of the ways they can do this is through improvement in their performance. Performance ensures that SMEs align their purposes or goals to their strategies effectively. Efficiency is desirable to SMEs since it enables them to maximize their profits.

An SME would be said to be efficient when it is able to; i) maximize output with the same amount of inputs and or; ii) minimize expenses without reducing output. APO (2015) asserts that the importance of productivity measurement for SMEs is the ability to meet customers' needs. They should also as well be aiming to improve their

productivity through upgrading productivity methods. One of the objectives of SMEs is to maximize profits. Another is to maximize the number of services to their customers. This can only be achieved if they are efficient, since then they would be producing more output with less inputs (Mwangi, 2014; Smith, 1997).

Profitability of SMEs is measured using traditional financial accounting performance measures. While the traditional financial performance measures may be the same for all SMEs, they fail to recognize that performance measures should be objective-driven, and firm's objectives differ. SME performance measures which are appropriate and aligned with their objectives determine their efficiencies as well as inefficiencies. Specifically, they deal with how well an SME can maximize its output from a given set of inputs. Inefficiency occurs when a firm is not able to maximize outputs while lowering expenses or when a firm is not able to increase output with the same level of expenses. The appropriate method of analysing inefficiency is by frontier analysis. Frontier analysis is concerned with the performance of firms. It uses inputs and outputs of a firm to determine its performance.

In their study, Coelli, Rao, O'Donnell and Battese (2005) identified conversion of inputs into outputs productivity ratio as a measure of productivity performance. Their conclusion was solely based on firms which utilize inputs and produce outputs. According to them, there are several measures that can be used to define performance of firms. One of these measures entails computation of productivity ratios (the ratio of outputs to inputs). A large ratio is associated with better performance of firms, and vice versa.

Coelli et al. (2005) asserted that a firm's performance could also be determined subjectively. Some of the methods discussed in their research are Least-squares econometric production models, Total factor productivity indices, Data envelopment analy-

sis and Stochastic frontiers. Higher firm efficiencies were associated with higher levels of production in relation to inputs used during production as well as costs, direct and indirect, incurred during production.

Neely, Filippini, Forza, Vinelli and Hii (2001) sought to determine the effectiveness or otherwise of businesses. They proved that businesses were found to be effective if their production costs were less than the total output. Production costs involved among other staff costs, finance costs and operating expenses. More firms were said to be efficient when a higher ratio of inputs versus outputs was obtained. The study also addressed factors leading to innovation for firms and the effect of innovation on business performance. Innovation and business performance were seen to have a positive relationship, such that more innovation led to better business performance. Results of the study were drawn from an exploratory study on perceptions of public policy makers and managers from two European regions (The Veneto region in Italy and the East of England in the U.K.).

Managers did not believe as much as policy makers that factors responsible for innovation were controllable by policy makers. While Ruirie (2012) agrees that efficiency may well be measured by the extent to which an entity has embraced innovation, a research gap in the study would probably be to determine policy makers' role in enhancing innovation for better firm performance and growth (Neely et al., 2001).

2.7.2 Parametric Approaches to Efficiency Measurement of Firms

Under parametric approaches, there are three firm performance measurement approaches. They are sometimes referred to as econometric. The three include the Stochastic Frontier Approach (SFA), the Deterministic Frontier Analysis (DFA) and the Thick Frontier Approach (TFA). The SFA uses a cost, production or profit function

from inputs, outputs and environmental factors to determine the efficiency or inefficiency of a firm. Actual input data is used to approximate the expected output. The difference between the expected output data and the actual comprises a random error. The random error is estimated to be normally distributed. Product inefficiencies on the other hand are assumed to be half normally distributed. A limitation with this approach is that a production function is needed. Further, it is hard to differentiate between random errors from inefficiency (Mwangi, 2014).

The DFA utilizes a production function just as in SFA. Expected output is determined from actual input data with this method. The difference between DFA and SFA is that inefficiency is noted when the predicted and actual output data are the same. DFA does not differentiate between the random error and production inefficiency. This method utilizes the assumption that over time, actual output and predicted output would be the same hence the inefficiency. Inefficiencies using the model can follow any line if they are not negative. DFA is limited just as in SFA where a production function is needed for determination of firm performance (Mwangi, 2014).

The TFA uses a production function set from the inputs and outputs. The expected output is determined from linking the production function to the highest as well as lowest performance quartiles. A random error exists when there are class deviations from the two expected performances. Inefficiency is determined from the difference between the expected output results from the two quartiles. TFA does not provide for the distribution of the random variable and inefficiencies. It faces the same challenge as SFA and DFA of requiring a production function. Further to this, it generalizes efficiencies and inefficiencies thus it does not give an account of efficiency or inefficiency for an individual unit (Mwangi, 2014).

2.7.3 Non-parametric Approaches to Efficiency Measurement of Firms

These are also referred to as mathematical programming frontier techniques and they are mainly two; the Data Envelopment Analysis (DEA) and the Free Disposal Hull (FDH). DEA is used to check the efficiency of one firm against that of another. It is a linear programming method used to show the difference in efficiencies between two firms dealing with the same type of goods or services. Relative ratios are obtained from weighting inputs and outputs for different firms then the one with the highest ratio is used as the standard to check inefficient firms (Mwangi, 2014). The method neither specifies inputs nor outputs but requires that those chosen for analysis fall within the framework of the firms being compared.

2.8 Characteristics of SMEs

Small and medium-size enterprises firm characteristics refer to the internal aspects of an organization that may be anticipated to influence its efficiency (USITC 2010). There is a wealth of empirical literature and opinion on a definite list of firm characteristics. However, a general consensus appears to emerge as to what constitutes SME characteristics.

To fathom the expanse, Unlucan (2010), studied on SME characteristic-efficiency relationship and identified number of employees; sales volume; unique product; innovation; better and more complete customer service; new job creation; flexibility, day to day operational activities and limited resources in form of capital humans and time as examples of SME characteristics. Unlucan (2010) contends that for a SMEs to survive, it must have centralized management, satisfactory government support and overseas exposure. Owners level of education and training, personal abilities and charac-

teristics, political affiliation and prior experiences are vital too (Unlucan, 2010). The study concluded that SME characteristics impact on SMEs efficiency.

A research by Woldie et al. (2008) to determine SME characteristics which influence SMEs performance identified four SME factors namely age, sector, legal status as well as the number of employees. Owner/Manager characteristics which were seen to be relevant to the performance of SMEs were the level of education, age, previous experience, and three motivational factors; finance, employment creation and self-fulfilment (Woldie et al., 2008). The study covered Nigeria only. It is likely there would be more pronounced results for the African continent with data coming from a variety of African countries. This study will focus on three firm characteristics namely firm size, firm age, and managerial competency, to meet the study objectives.

2.8.1 Size of SMEs

The influence of size on the efficiency of SMEs has been tackled by many authors (Lundvall, & Battese, 2007; Brown & O'Connor, 1995; Charoenrat, Harvie & Amornkitvikai, 2013; Levine, 2005). However, studies on the manufacturing SMEs in Eastern Africa and how size impacts efficiency are scanty. However, Lundvall and Battese (2007) researching on manufacturing firms in specific sectors - food, wood, textile and metal, in Kenya, investigated the question whether technical efficiency could be systematically related to the size and age of firms. The study concluded that firm size has a positive and significant effect in the wood and textile sectors while age was significant only in the textiles sector.

Charoenrat et al. (2013) support the idea that the size of an SME is a crucial element of efficiency. Their study aimed at finding out the technical efficiency of Thai manufacturing SMEs and key factors impacting upon it. Their inefficiency effects model

revealed that firm size and skilled labour as some of the factors that significantly affect the technical inefficiency of production. To address the issue of technical inefficiency of Thai manufacturing firms, some of the proposed measures were an adequate supply of inputs, access to credit facilities, extensive infrastructural development and training programs for employees.

Size was taken to refer to the number of workers or fixed assets excluding land. Small firms were those employing up to 50 workers with fixed assets, excluding land, not exceeding THB 50 million (approximately US\$1.65 million) while medium enterprises were those employing between 51-200 workers or with fixed assets, excluding land, greater than THB 50 million up to THB 200 million. Maximum likelihood method was used to explain the relationship between size and the technical efficiency of Thai manufacturing firms. Technical efficiency of the Thai manufacturing firms on the other hand was ascertained by Stochastic Frontier Analysis (SFA). A sample size of 56, 441 Thai manufacturing firms was used in the analysis of results. Brown and O'Connor (1995), studied the relationship between size and efficiency of credit unions in the Victorian state of Australia.

They found that efficiency decreased with size for small industrial credit unions while for other categories, efficiency did not vary with size. Efficiency was measured using a parametric cost equation and the data obtained was for the years 1983, 1986, 1990 and 1993; the responsive firms were 127, 108, 100 and 76 for the years respectively. A research gap exists since a technical relationship of the inputs and outputs used in the cost function was not determined. The results obtained are subject to model misspecification (Brown & O'Connor, 1995).

Unlucan (2010), in their study on SME characteristic-efficiency relationship says that SMEs are characterized by number of employees and sales volume among others. Un-

lucan (2010) contend that for an SME to survive, it must have centralized management, satisfactory government support and overseas exposure. The study concluded that SME characteristics impact on SMEs efficiency.

The size of an SME is its total value of assets or the number of full time employees. A higher number of employees and total assets are expected to give rise to bigger size of SMEs and ultimately higher efficiency. The number of employees in an organization determines its size and by extension, its efficiency (Woldie et al., 2008). A higher efficiency is expected for an SME with a high number of employees due to high levels of specialization and division of labour.

The relationship between the size of an SME and economies of scope has been studied variously (Goddard, Mckillop & Wilson, 2008; Mwangi, 2014; Murray & White, 1983). Firms experience economies of scope when marginal costs of additional products and services are lower than increase in revenues since these products would be utilizing existing infrastructure. Economies of scope can also occur when there is slack in processes of production. In the event of a slack in production, firms benefit more from increasing products or services or both, as they enhance their efficiencies as well as economies of scope. Goddard et al. (2008); Murray and White (1983), state that increase in the size of a firm is because of increase in the size of economies of scale.

The pecking order theory argues that capital structure is driven by firm's desire to finance new investment, first internally, then with low-risk debt, and finally if all else is exhausted, with equity. Therefore, firms prefer internal financing to external financing (Myers & Majluf, 1984). This theory is relevant for large firms as well as small firms. Since small firms are opaque and have important adverse selection shortcomings that

are explained by credit rationing; the consequence is they bear high information costs, (Psillaki, 2008).

This theory elucidates the relationship between two major SME characteristics (size & age) and efficiency. By extending Myers and Majluf (1984) argument as above, this study argue that firms prefer informal financing to formal financing (Myers & Majluf, 1984). This happens simultaneously as they grow, Figure 1.1, (IFC, 2010).

In a study on “productivity and turnover in the export market” using micro and small medium-size enterprises in Taiwan and Korea in 2000, results revealed that exporting producers had higher productivity than non - exporters for the case of small and medium enterprises based in Taiwan.

The focus of Aw, Chung and Roberts (2000) study was on determining relationship between productivity and the movement of producers into and out of the export market. There were no major differences in productivity with entry or exit of the international market that is consistent with learning from exporting for the Korean based SMEs (Aw et al., 2000). Results were drawn from manufacturing data from the Republic of Korea and Taiwan (China).

The data contained information on output and inputs of capital, labour, and raw materials that allowed them to construct an index of TFP for each plant. For Taiwan (China) firm output is defined as total firm sales deflated by a wholesale price index defined at the two-digit industry level. For Korea the value of plant output is measured as the sum of total revenue from sales, repairing and fixing services, and subcontracted work, and the change in the inventory of final goods. It is deflated by a producer price index defined at the two-digit industry level.

To find out if higher productivity is the motive of SMEs into the export market, Aw et al. (2000) ask whether the firms that subsequently enter the export market have higher initial productivity than those that remain specialized in the domestic market. In the case of Taiwan (China) observations are at the firm level for the census years 1981, 1986, and 1991, for the case of Korea plant-level observations for the years 1983, 1988, and 1993 are used. TFP index is addressed as the log of the plant's outputs minus a revenue-share-weighted sum of the log of the plant's inputs.

Furthermore, the USITC (2010) did a study on the characteristics and efficiency of SMEs in relation to their exporting abilities. They found out that SME exporting firms were better in their efficiency than their counterparts because of an enhanced market size. Service exporting SMEs were also found to be doing much better than large firms involved in the exportation of services. It was found that the size of market for an SME is crucial since SMEs with large market shares experience greater sales revenues, growth as well as labour productivity as opposed to non-exporting firms. The sample size used was appropriate (9,000 large firms and SMEs) but there would be a need for similar studies but this time with more data on SMEs. The data used by USITC composed more of large firms than SMEs.

A study by Abdulli (2013) indicates that the number of employees in an SME is crucial in determining its efficiency. According to the study, there is a positive relationship between the number of employees and SMEs efficiency. The relationship between SME efficiency and number of employees is attributed to the likelihood of a human resource section with increase in number of employees. As employees in an SME increase, it is likely for it to have a human resource section responsible for overseeing the management of the labour force. As Abdulli (2013), asserts, a firm's survival is dependent on its effective management of human resources. A firm, on the

other hand is more likely to have a human resource section if its employees are considerably large in number.

The results of the study were ascertained theoretically as well as empirically using 150 small and medium enterprises based in the Republic of Macedonia during the period 15 May to 22 July 2011. The research was carried out using the technique of direct contact with respondents, mail and email. The statistical program SPSS and cross tabulation allowed the gathering of the information of the relationship of multiple variables. Still, a regression analysis was conducted allowing the identification of relationships between variables. The aim of the study was to ascertain the effect of training of employees on firm's efficiency. A study on the direct relationship between the number of employees and firm performance would be handy.

A research by Woldie et al. (2008) to determine SME characteristics which influence SMEs performance indicated that the performance of SMEs is influenced by four SME factors, among them being number of employees as well as the sector. A total of 523 SME owner/managers were used to provide conclusions for the study via questionnaires. The aim of the study was to find out the relationship between turnover growth and age, sector, legal status and number of employees in an SME. Data was then analysed using descriptive statistics as well as bivariate analysis. It was found that the number of employees had a positive relationship with the performance of SMEs hence their growth.

Firm growth was measured using the perceptions of the owner/managers, who were asked to classify their turnover in the last two years in three categories, namely: decreased and remained the same, increased slightly, increased greatly. The data collected from the self-administered questionnaire were analysed by using descriptive statistics based mainly on frequency distribution and percentage value. In addition, bivariate

ate analysis was used to determine the characteristics of the growing firms. Thus, the higher the number of employees in an SME the more chances for its growth. The study attempted to cover the African continent but ended up researching on Nigeria only.

Bayarçelik, Taşel and Apak (2014) in a research to determine factors impacting efficiencies of SMEs in relation to their innovative capacities identified firm size, financial factor, and competitive advantage among eleven. This study measured size of the firm by value of total assets, value of turnover, and number of employee as did Charoenrat et al. (2013) and Brown and O'Connor (1995).

2.8.2 Age of SMEs

According to Banerjee (2014); Jasra et al. (2011) and Nangoli et al. (2013) efficiency of SMEs declines with their age. Thus, a negative relationship is expected between efficiency and the growth of young firms. The survival and hence age of an SME is dependent on its level of finance. Nangoli et al. (2013) findings emphasized the importance of reinvesting back of profits by managers and employees, payment of taxes on time to ease tax burden, prioritizing expenditure decisions as well as attending refresher courses to sharpen business management skills. Their findings also signified a need for low cost finances to the SMEs. These low-cost finances could be extended by governments, donors and micro finance institutions. Jasra et al. (2011) also support the notion that survival of SMEs is because of finances available to them.

From their study Jasra et al. (2011), financial resources were seen to be the most important factors in the success of any business, as perceived by small and medium enterprises in the study. The study aimed at determining the role of key factors in the success of SMEs in Pakistan. Results were drawn from a sample size of 520 small and

medium lines of businesses in different lines of business. Research findings indicated a significant relationship between business success and its determinants.

Charoenrat et al. (2013) contends that SME age is an element of efficiency. In their study aimed at finding out the technical efficiency of Thai manufacturing SMEs and key factors impacting upon it, their inefficiency effects model demonstrates that, firm age, significantly affect the technical inefficiency of production. One of the solutions proposed by Charoenrat et al. (2013) to address the issue of technical inefficiency of Thai manufacturing firms, were access to credit facilities, an adequate supply of inputs, and training programs for employees.

Banerjee (2014) sought to examine the relationship between age of an SME and its contribution to the growth of a country. The research also aimed to ascertain profitability of SMEs of different ages. It was revealed that the younger a firm was the more likely it was to contribute to employment growth of a country. Furthermore, contrary to popular belief that young rather than old firms were seen to be the key contributors to profit growth in countries. Age of firms was taken to mean the number of years of the firms since inception. Efficiency of the firms on the other hand was represented by their profitability. Profitability was ascertained through questionnaires in which firms were asked to equate decrease or increase of profits with increase in age of firms, the firms had been controlled for size.

Start-ups cited finances as their greatest obstacle whereby they received smaller new loans, and this was seen to hinder the growth of the firms. There were no reports of financial constraints from older firms for SMEs in pre-crisis data. Results of the study were obtained from business data register (from US census Bureau) firm level surveys, European Commission SAFE survey and World Banks's World Business Environment survey, a one-off survey of firms across many countries carried out between

1999 and 2000. The focus of the study was on young and old firms from the United States, a similar study would be of benefit to the Kenyan economy but with focus on the effect of SMEs age on profitability.

Zhou and Wit (2009) asserted that organizational determinants have the most influence on firm growth, specifically, the older a firm is the less likely it is to grow, again, contrary to popular belief that the older a firm the more efficient. Zhou and Wit (2009) ascertained this to undertake an integrated analysis of the determinants of firm growth. A sample of 523 Dutch small and medium sized firms was used in the conclusion of the study. A multivariate linear regression model was used to test the influence of growth motivation, specific skills, need for achievement, firm age, financial performance, extra finance, and preparedness to grow on firm growth. Firm age was taken to represent the number of years the SME had been in existence and Information concerning the SMEs employment, turnover and profits for the periods 2005 and 2003 was ascertained via questionnaire.

Important to Zhou and Wit (2009) findings was the fact that firm growth is dependent on availability of finance. Its continued existence which represented age depended on availability of finance in those firms. The notion that the age of an SME is influenced by availability of finances to it has been supported and clarified by a number of authors like Nangoli et al. (2013) and Jasra et al. (2011). By extending Myers and Majluf (1984) argument firms prefer informal financing to formal financing (Myers & Majluf, 1984). This happens simultaneously as they age, Figure 1.1 (IFC, 2010).

A research by Woldie et al. (2008) to determine SME characteristics which influence SMEs performance indicated that the performance of SMEs is influenced by four SME factors namely age, sector, legal status as well as the number of employees. A total of 523 SME owner/managers were used to provide conclusions for the study via

questionnaires. The aim of the study was to find out the relationship between Turnover growth and age, sector, legal status and number of employees in an SME. Data was then analysed using descriptive statistics as well as bivariate analysis.

Owner/Manager characteristics which were seen to be relevant to the performance of SMEs included age, and three motivational factors; finance, employment creation and self- fulfilment. The study covered Nigeria in African continent. This study chose to measure SME age, the number of years the SME has been in existence since inception as did Banerjee (2014) and Zhou and Wit (2009).

2.8.3 Managerial Competency

Unlucan (2010), in his study on SME characteristic-efficiency relationship says that SMEs are characterized by unique and limited resources in form of capital humans, innovation; better and more complete customer service; flexibility, day to day operational activities and time. Unlucan (2010) contend that for an SME to survive, it must have centralized management, satisfactory government support and overseas exposure. Owners level of education and training, personal abilities and characteristics, political affiliation and prior experiences are vital too (Unlucan, 2010). The study concluded that SME characteristics impact their efficiency.

The resource-based view of organizations denotes that the performance or efficiency of firms is influenced by its competencies as well as its resources. According to Carmeli (2001), one of the key competencies crucial in determining the level of performance of an organization is managerial competency. Managerial competency is the knowledge, skills and experience of managers of an organization. A positive relationship is expected between managerial competency and efficiency of SMEs.

Managerial competency is determined mainly by their entrepreneurial orientation. Kraus, Rigtering, Hughes and Hosman (2010) as well as Mkala et al. (2017) contend that entrepreneurial orientation is a critical business strategy in enhancing firm efficiency and proposes that manufacturing SMEs should practice EO as Barney (1986) concurs. According to Ruirie (2012), inadequate business skills hinder efficiency through inept and uninformed decisions and choices. Internal inefficiencies often lead to customer dissatisfaction, eventual loss of market and negative growth.

The opposite holds true. Innovation of management is influenced by managerial competencies so that the higher they are, the higher the level of innovation of management will be and vice versa (Tether, 2003; Basterretxea & Martinez, 2012). Innovation of management is defined as the way through which managers influence the adaptability of new products as well as services to meet customers' needs. An example is the introduction of new products and or services. Higher levels of innovation of management are associated with higher levels of firm performance (Tether, 2003; Basterretxea & Martinez, 2012).

There is a positive relationship between adoption of technology and entrepreneurial orientation (Swierczek & Thai, 2003; Wiklund & Shepherd, 2005; Yusuf, 2002). From a theoretical view point, entrepreneurial orientation determines the rate at which firms become first movers and capitalize on emerging opportunities enhancing their firm's performance (Wiklund, 1999). Entrepreneurial orientation according to Swierczek and Thai (2003); Wiklund and Shepherd (2005) and Yusuf (2002), is the level of innovativeness, pro-activeness as well as the ability to take risks by decision makers.

Decision makers are likely to adopt new technology, if they have a high level of entrepreneurial orientation, which would ultimately lead to better firm performance in the right environment. From an empirical point of view, adoption of technology has a

positive relationship with EO, (Swierczek & Thai, 2003; Wiklund & Shepherd, 2005; Yusuf, 2002). Entrepreneurial orientation is a critical business strategy in enhancing firm efficiency and manufacturing SMEs should practice EO (Mkala et al., 2017).

Sanda, Sackey and Faltholm (2011) recognize the fact that managerial competency has an impact on the efficiency of small and medium enterprises. Their conclusion is based on 72 executives who provided information for the study using questionnaires. Their results show that managers of small firms in Ghana have the necessary managerial competencies to influence the performance of their firms but are limited by their capabilities. Sanda et al. (2011) advocate for adequate capabilities for managers to execute their competencies for enhanced firm performance. Managerial competencies in the study are defined by the level of education, skills as well as experiences of the managers in years worked. The study would have more reliable results with a focus on SMEs in a variety of countries.

According to Zarook, Rahman and Khanam (2013) study on effect of management skills of SMEs on access to financing in Libya, using a quantitative research method where data from 557 SMEs was collected, results showed that management skills, experience levels and education levels have significant positive effect on access to finance unlike business planning and political connections.

According to Industry Canada (2003), there is a positive relationship between management competencies and efficiency of SMEs. In the study, management competencies are represented via skills, experiences as well as levels of education of managers. The study aimed at identifying the relationship between management competencies and owner perceptions and SMEs efficiencies. The depth of experience of the managers was determined by the number of years of business management currently as well as the total years of management experience.

Skills on other hand were ascertained by owners' self-ratings of their abilities and experiences on 25 activities carried out by SME owners. A multivariate statistical framework was used to determine the relationships among perceptions of success, management competency measures, and firm performance. Growth in revenues was significantly correlated with the diversity, or breadth, of management skills and with the owners' intentions to pursue growth.

The study used a sample of 1002 respondent to WEI survey of 2002 where a response rate of 46.2% was achieved. Industry Canada (2003) recommends continuous skill development for better firm performance. A similar study in a developing economy may add new knowledge.

To identify factors responsible for innovation in firms, Laforet (2013) identified innovations as new ways of doing things or advancements in technology. Innovations were also seen as taken as hardware and/or software at the end of each year plus expensed software costs in the year. Laforet (2013) also stated that a few of the ways that innovation could be measured include use of patents, subjectively and any significant innovations. In the study, results were drawn from company interviews as well as survey. The study sought to examine the importance of innovation for SMEs. Results revealed that innovation enhanced productivity and market leadership. Grounded theory was used in the derivation of the results. Results also revealed that innovation effects were more pronounced for small and medium sized enterprises than large enterprises. Many studies such as Laforet (2013) and Bayarçelik et al. (2014) have also revealed that SMEs struggle with innovative capabilities and it is in line with this that Bayarçelik et al. (2014) findings that innovative capacities and SMEs efficiencies are addressed.

Bayarçelik et al. (2014) did a research to determine factors influencing innovation in SMEs and found eleven factors responsible. Their research is crucial in explaining factors that are a hindrance to higher efficiencies of SMEs in relation to their innovative capacities. Among the factors identified by Bayarçelik et al. (2014) as hindrance to the innovation capabilities of firms are management skills, learning capability, culture factor, technological capability, and consumer preferences. A sample of 34 SMEs owner and managers was used in the identification of the factors above. Due to their limited sample size, the study would benefit from a more representative sample.

A research by Woldie et al. (2008) to determine SME characteristics in Nigeria which influence SMEs performance identified owner/manager characteristics which were seen to be relevant to the performance of SMEs their level of education, age, previous experience, and three motivational factors thus; finance, employment creation and self- fulfilment. This study takes the queue from Sanda et al. (2011) and Industry Canada (2003) to measure managerial competency by years of experience in management, level of education, and level of innovation.

2.9 Alternative Finance

SMEs have special financial needs since they do not have capacity to meet stringent requirements to access formal finance, forcing them to rely heavily on alternative finance. These stringent requirements include collateral, guarantors, audited financial statements and history of a stable income (Erick, 2014; Manasseh, 2007).

Alternative finance is often the dominant source of funds for firms in fast-growing economies (Abdulsaleh & Worthington, 2013; Kihimbo et al., 2012). Compared to traditional sources, alternative financing channels provide an equally important source of funds in developed and developing countries. In Kenya, even though SMEs play a

major role in promoting economic growth, the problem of financing is still prevalent. Finance cost, manufacturing cost factors and political instability are major causes for SMEs failures in Kenya hence more effort needs to be focused in these areas (Ruirie, 2010).

Compared to large firms, SMEs' financial decisions and behaviour are significantly unique (Forkuoh et al., 2015; Abdulsaleh & Worthington, 2013). According to financial growth cycle paradigm proposed by Berger and Udell (1998), firms require different financing strategies throughout the various phases of their lifecycle. During start-up phase, SMEs depend heavily on alternative finance (Abdulsaleh & Worthington, 2013). For SMEs in both developing and developed countries, the use of trade credit stands out to be the most prominent source of finance (Giannetti, et al., 2011; Kim & Shin, 2007). Murfin and Njoroge (2012) found out that the largest firms in the US are also net receivers of trade credits.

Allen, Qian, and Qian (2005) demonstrated that China, currently the second largest economy in the world, provides a significant counter-example to most of the existing research in law, institutions, finance, and growth. During China's transformation (1980-2010), neither its legal institutions nor its traditional financial systems were well developed, and the government was regarded as autocratic and corrupt. However, its economy grew at the fastest pace in the world. This was because the most dynamic corporate sector, with various forms of private ownerships (including joint ownership with local governments), relied mostly on alternative finance and provided the engine for economic growth.

According to IFC (2010) studies, SMEs at inception entirely rely on alternative (informal sources) of finance such as from personal saving, friends and MFIs. They are therefore, almost entirely financially excluded as entities, safe for the FI of their own-

ers and or investors. At this stage, they are mainly at micro stage, refer to Figure 1.1 - SME finance coverage (IFC, 2010).

The WBG, (2014) illustration on Figure 1.1 - SME finance coverage, IFC (2010) clearly shows that if the SME survives and graduates to a small enterprise, then it can plan in the medium term and can enjoy more FI for it can get trade financing, factoring, lease financing and also formal bank financing.

If lucky to grow into a medium-size enterprise, the WBG – IFC, IBRD and IDA (2014) illustration on Figure 1.1 - SME finance coverage, WBG – IBRD, IDA and IFC, (2010) asserts that the SME then will not only think medium-term but also long term. It will not only enjoy more FI in form of trade financing, factoring, lease financing and formal bank financing, but will also be able to venture into private equity capital market (WBG – IBRD, IDA & IFC, 2010).

Firm financing primarily depends on bank loans, IFC (2010). However, past crisis in emerging economies revealed that bank financing is not a reliable source of financing, especially during periods of systemic stress (Waweru & Karani, 2009). Securitization provides an important contribution to SMEs' access to finance. Despite other factors that challenge the survival and growth of SMEs in developing countries, finance has been identified as one of the most important factors. The existence of Non-Bank Financial Institutions (NBFI) which offers a wide range of financial services and performs transactions that are needed by the under-banked population is very important in an economy. A well-developed NBFI system can play a major role in achieving the developmental goals of developing countries (IFC, 2010; Kihimbo et al., 2012).

Informal financial markets are not regulated marketplaces but may trade in some forms of financial securities, commodities and even value but at fluctuating transac-

tion costs and forces of supply and demand may not determine the price due to information opacity. Informal financial markets may offer intermediation as well as financial functions.

They are neither segmented on market levels nor are their security types distinct, owing to lack of regulation and opacity. Some products include accruals and debt-based securities, bills of exchange, business angel financing, factoring, hire purchase, invoice trading, lease finance, loans from family members, loans from microfinance institutions, peer to peer consumer lending peer to peer lending, personal savings, promissory-notes, retained earnings, SACCO loans, table banking services, trade credit, and venture capital.

Among the developing countries and especially Kenya, venture capital has been present since independence. Venture Capital is quite prevalent in developed financial markets for small or start-up firms. A promising business whose growth has been constrained by shortage of capital or increased cost of borrowing will have another source of finance in venture capital (Karanja et al., 2012). Fewer than 20 per cent of SMEs in Kenya have ever received credit from formal financial institutions. Access is limited due to challenges in assessing SME risk in a cost-effective manner. Other sources of capital adopted by varieties of SMEs include; loan from micro-finance institutions and other private sources like personal savings, friends and relatives (Forkuoh et al., 2015).

Considering the determinants of choice of alternative financing modes for SMEs, Wert, Glenn and Henderson (1979) noted that the suitability of funds obtained and project for which funds are obtained is very important. Another factor that determines the choice of an alternative financing mode is financial leverage (Wert et al., 1979). Bayarçelik, et al., (2014) in a research to determine factors influencing innovation in

SMEs found financial factor, economic factor, competitive advantage and consumer preferences as crucial hindrances to higher efficiencies of SMEs in relation to their innovative capacities.

2.9.1 Kenya's Economic Performance

For faster acceleration of growth, Kenya requires alternative finance to augment formal credit sources. WBG – IBRD and IDA (2017), Gaya and Mogollon in their (2015) Kenya Economic Update report cite Kenya as being among the fastest growing economies in Africa, poised to achieve a 7% growth rate for year 2017. This was from a trajectory of 5.4 in 2014 to 6% in 2015 and 6.6% in 2016. Kenya had an expansive fiscal policy which allowed the country to finance infrastructure projects without exerting undue pressure on domestic financial markets, keeping public debt within the 50% threshold. Gaya and Mogollon (2015) argued that Kenya had sound economic policies in place to spur development. The 2017 World Bank report however show that GDP growth in 2016 was 5.9 percent, in 2017 was 4.5 percent, 5.8 for 2018 with a trajectory of 5.8% for 2019, indicating economic slowdown.

Though supported by stable macroeconomic environment, low oil prices, increased tourism and an ambitious public investment drive. By March 2017, inflation rose to 5-year high at 10.3 percent, due to increased energy costs, with spill-overs to other sectors, (World Bank Group - IBRD & IDA, 2017). By January 2018 inflation had gone down to 4.83 per cent. This scenario was further dampened by Kenya's public debt, currently estimated at 52%, projected to hit 55% by end of 2018. The report now notes sluggish external demand for exports and a declining production for export as dominant contributors of the increasing current account deficit. The main culprit here remains the manufacturing sector in the private sector, which has stagnated in recent

years. The report recommends urgent need to revive private sector, reversing negative credit growths and revenue mobilization by increasing turnover, (World Bank Group - IBRD & IDA, 2017).

According to various research works and institutional publications on the Kenyan economy, SMEs in Kenya as is in other economies employ a large share of the labour force. Further, the sector is perceived as an alternative employer. These studies show that SMEs are at least as important as large firms in the creation of gross and net new jobs. Notwithstanding their importance, most SMEs struggle and fail due to lack of finance (Ayyagari et al., 2007; KNBS, 2017; WBG - IBRD & IDA, 2014; 2017).

2.9.2 Kenya's Vision 2030

To achieve vision 2030 economic growth, input of alternative finance is imperative. According to GOK (2015), Vision 2030 is Kenya's current blue-print for its future economic growth. Its long-term goals are to create a prosperous and globally competitive nation with a high quality of life by the year 2030. It aims to do so by transforming Kenyan industry while ensuring a clean and secure environment. It has a three-pronged approach divided into economic, social and political governance pillars (GOK, 2015).

The economic pillars' endeavour to achieve a constant 10% growth in the GDP has been elusive this far. A major contributor to this drawback is the manufacturing sector whose growth has stagnated since 1980s. A closer monitoring of the manufacturing sector, therefore, would not only bring out the efficiency trends or otherwise, but also the ills bedevilling the industry for resolution. Appendix 4[(a) & (b)]; World Bank (2017), GDP per capita, PPP (current international \$) shows the GDP per capita based

on purchasing power parity (PPP) for Kenya, South Africa, China and India for 1964 to 2016.

The superlative shows Kenya's pathetic stagnation since 1964, while the trends for India, South Africa and China depict exponential trajectories with Chinas' portraying a higher exponential power [Appendix 4(a) & (b)]. The first Medium Term Plan (MTP) 2008-2012 targets for realizing Vision 2030 remain largely unachieved in terms of contribution of the sector to GDP and implementation of flagship projects. Vision 2030 envisaged a robust, diversified and competitive manufacturing sector capable of accelerating employment and economic growth. This vision is not far-fetched, given Kenya's potential. Globally, a prosperous SME sector is associated with positive economic growth. The moderating impact of alternative finance is expected to play a vital role in efficiency, competitiveness and eventual growth of SMEs for Kenya to achieve its vision.

2.9.3 Kenya's Manufacturing Sector

For the manufacturing sector in Kenya to reach its potential, alternative finance will be necessary, to support the SMEs' peculiar financial needs while sealing strained formal sources of credit. On Kenya's manufacturing sector, recent studies by World Bank – IBRD and IDA (2017) reveal that to boost its competitiveness, there is need to decrease cost of finance, expand cross-border trade, streamline policy and support by government. Further, imperative to facilitate flow of skills, technology, information among firms, ensure fiscal stability and boost firm-level productivity (World Bank - IBRD, IDA, 2017). To this end, the influence of alternative finance to boost SMEs efficiency is vital.

Although Kenya is the most industrially developed country in East Africa, manufacturing accounts for only 14 percent of its GDP (Mkala et al., 2017). This level of manufacturing GDP represents only a slight increase since independence. The manufacturing sector has high potential in employment creation and poverty alleviation since it is less affected by land size (Bigsten et al., 2010). Expansion of the sector after independence was initially rapid but has stagnated since the 1980s. The contribution of the manufacturing sector to GDP has continued to stagnate at about 14 percent, with contribution to wage employment on a declining trend.

The need to increase competitiveness of the manufacturing sector to increase economic growth, exports and jobs is reemphasized (World Bank - IBRD, IDA., 2017; 2015; 2013; KIPPRA, 2013). Fundamental to revitalization and realization of its potential is the moderating impact of alternative finance on the SME characteristics (Allen et al., 2005).

2.9.4 Financial Inclusion of SMEs

Financial Inclusion of SMEs enterprises in an economy is vital. Well-functioning financial systems serve a pivotal purpose, offering savings, and credit, payment, and risk management products. Financial inclusion is relatively a new terminology, and little in terms of research had been done in this area up and until 2014. For example, it is only in 2012 that the WBG – IFC IBRD and IDA provided its first analysis of the global FI of SMEs (Global FIndex) in the database in their world-bank policy research working paper no. 6025. This scenario is quickly changing with substantial amount of information now available, including country specific surveys. In Kenya for instance, the CBK, KNBS and FSD Kenya Publishes regular publication on financial access called Finances.

Financial inclusion allows financial services to all without cost or non-cost barriers. Without financial services, people are left to rely on their own limited resources to invest. Even when they do, they can only manage SMEs, many of which do not survive for long, let alone grow. It therefore follows then that FI affects both individuals and enterprises and impacts economic growth (WBG – IFC, IBRD & IDA, 2012).

As early as 2006, the concern for the impact of financial inclusion of SMEs on the economic growth was raised by Rakesh (2006_a). He contends that micro-credits and self-help groups provide an impetus for growth of the banking sector, and banks require households by their door steps to survive. In his view, FI would strengthen financial deepening, facilitating economic growth. According to Rakesh (2006_b), financial exclusion would lead to complications in the day-to-day cash flow management, while dealing entirely in cash and the firm would lack financial planning and security, exposing it to risk.

According to Masoud and Hardaker (2012), the banking sector and the stock market play a complementary role and are not substitutes in their provision of formal financial services. On the other hand, Allen et al. (2011); Beck et al. (2005), (2008) and Baeck et al. (2014) view AF as the receipt of funds from non-bank and market sources, making formal and informal sources complementary of a whole. While the formal composes of banks and financial market, the informal composes of all alternative sources.

For appreciation, according to Demirguc-Kunt and Klapper (2012); World Bank – IFC, (2008; 2012), the level of financial inclusion can be measured either by access to financial services; or usage of financial services. Still, the quality of the products and the service delivery is another good measure. On the other hand, Mandira (2010) proposes a multidimensional index of financial inclusion of SMEs (IFI) in one single

number lying between 0 and 1, where 0 denotes complete financial exclusion and 1 indicates complete FI of SMEs in an economy.

2.10 Research Gaps

The literature review has shown knowledge gaps as to whether alternative finance for SMEs impacts the relationship between characteristics and efficiency of organizations. There are clear pointers to a research gap in that a closer finance perspective monitoring of SMEs, more so in the manufacturing sector is imperative. It is worthwhile for researchers to bring out the efficiency trends for SMEs and isolate those factors that contribute to enhancing efficiency of SMEs.

Globally, SMEs face more and peculiar challenges in doing business than do large enterprises. Moreover, these challenges are more prevalent in poor and developing countries. These SMEs major challenges manifest through difficulties in accessing credit to finance start-ups, facilitating expansion programs, through high risk ratings, having small portfolios, information opacity and high transaction cost associated with commercial lending. Research in these areas, more so in developing countries is scanty.

Reviewed literature shows that some alternative finance models showed mixed outcomes in different economies. Still, AF remains in contention as the preferred mode of financing start-ups. On the other hand, social-cultural and demographic issues appear to play a vital role in AF, as studies by Allen et al. (2005); and Giannetti et al. (2011) elucidate, more so in China. Since factors influencing choice of AF remain unclear, scholars must pursue the search for solutions, directing their energies to poor and developing economies.

Available literature finds divergent views on the relationship between characteristics and efficiency. While Esho (2001) found a positive relationship for Australian organizations, Crapp (1983) reported a negative relationship for firms in the US. Fried et al. (1993) still in the US found no relationship at all, between some characteristics and efficiency. These mixed findings point to unfinished discourse for researchers, a glaring research gap.

In theory, various SME characteristics impact efficiency. Existing empirical studies have rarely modelled the relationship between characteristics and efficiency with any appropriate moderating and or intervening variables. The effect of an independent variable on a dependent variable is enhanced if an appropriate moderating variable is influenced. Further, the impact of an independent variable on a dependent variable is enhanced if an appropriate intervening variable is identified and influenced. These relationships need scholarly examinations, more so since research in these areas are scanty. Another research gap therefore emerges.

2.11 Summary

The study reviewed literature on firm size, firm age and managerial competency as characteristics of SMEs; relationship between firm characteristics and efficiency; theoretical orientation of the study; firm efficiency; and alternative finance. The literature review shows that AF for SMEs appears to impact the relationship between characteristics and efficiency of organizations. The theories presented above address theoretical underpinnings of the study. The chapter captured the conceptualization of interactions among the independent, moderating and dependent variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology composed of the research philosophy that guided the study, the research design, the population and research site. Further, it discusses the sampling design, sample size, pilot test, data collection, data validity and reliability considerations. Also, it discusses how the variables were operationalized, model diagnostics and explain how data was analysed and presented.

3.2 Research Philosophy

Research philosophy is the underlying fundamental belief that underpins the choices that require to be made in adopting a research position. The philosophy has implications on what, how, and why research is carried out (Carson, Gilmore, Perry & Gronhaug, 2001; Mwangi, 2014). Methodology provides a technique through which empiricists/ interpretivists arrive at epistemology or at ontology (Mwangi, 2014; Perry, Reige & Brown, 1999). While epistemology and ontology are diverse philosophical view-points, empiricists/interpretivists are research approaches which may employ either qualitative or quantitative method.

At the disposal of a researcher are strategies such as deduction, induction, case study, and experiment for the researcher to adopt after determining the approach to use. Positivism assumes that individuals have a direct unmediated access to the real world and that it is possible to obtain objective knowledge about this single external reality. Positivists use mathematical techniques for quantitative data processing in trying to measure and discover reality that is assumed to exist based on natural laws and mechanisms (Carson et al., 2001; Mwangi, 2014).

This study is based on the positivism philosophy. This is primarily because the study is a survey, that it utilizes statistical data analysis techniques as well as was based on existing theory and hypotheses formulated. This structured approach affords the use of the research results for generalization in similar circumstances (Zikmund, Babin, Carr & Griffin, 2010).

3.3 Research Design

Research design is the blue print used to guide a research study. The design ensures that the study addresses the research problem. This study used cross-sectional research design, a sub-set of the descriptive approach. This cross-section research design is most suitable to the type of data targeted. This study involves collecting and analysing study data at a point in time or over short to medium-term time horizon, to be used to assess strength of relationships among variables (Leedy & Ormrod, 2001; Miles & Huberman, 1994; Mwangi, 2014; Sekaran, 2003; Williams, 2007).

3.4 Population of the Study

Population refers to the entire group of people, events, or things of interest that the study wishes to investigate (Buglear, 2003). Castillo (2009) and Polit and Beck (2003) further made a distinction between target and accessible population. While target population is the entire group on which the study wants to generalize, accessible population is that part of target population whose conclusions the study can apply.

The study targeted SMEs for various reasons including: Studies have shown that SMEs remain the main driver of productivity and economic growth globally (Abdulsaleh & Worthington, 2013; Asian Productivity Organization [APO], 2015). Further, SMEs are the main users of alternative finance, since only a few SMEs readily access formal financing (FI) as a source of capital (Figure 1.1; IFC, 2010). Finally, the study

recognizes need for SMEs to belong to welfare associations such as KAM for financial advocacy, homogeneity and merging for size. EIS, (2005), in their study on “*The Economic Role of SMEs in World Economy*”, point out that sustainable SME development require concerted efforts of various parties, among the leading ones being local business associations (EIS, 2005).

For this study, the target population was all manufacturing SMEs in Kenya. The accessible population of the study was the 171 SME member institutions in Kenya Association on Manufacturers register - 2014. The sampling frame was the 776 member firms in the KAM directory of 2014. While the unit of analysis was the SME, the unit of enquiry was the owner/manager.

3.5 Sample Size and Sampling Technique

By use of KAM classification criteria of an SME, this research adopted a census approach. From the 776 members of KAM 2014 publication, the study selected all 171 SMEs, constituting a sampling frame. A census was done, affording a high response rate to facilitate generalization (Castillo, 2009).

3.6 Data Collection Instruments

According to Kothari (2004), data collection is the process by which a researcher receives responses from the targeted population. This study relied on primary data which was collected using a semi-structured questionnaire. Cross-sectional data covered 2012 to 2016 in part D2 of the questionnaire, where simple average was used since the study was cross-sectional. Various statistical data types were obtained. Interviews were also conducted as a way of validating the responses in the questionnaire.

According to Maria, Ofafa and Thoruwa (2014), a questionnaire consists of some structured set of questions designed to get information from respondents, prepared in lay language, simple and direct. The researcher administered the questionnaire in a variety of methods, face to face, drop collect later, via email and follow-up telephone calls where contact was anticipated to provide a good link to network. This was to enhance the response rate.

In their research paper, Maria, et al. (2014) points out that questionnaires have advantages such as low cost, they are free from bias of the interviewer, answers are in the words on the respondents' own words. Further respondents can also be reached electronically via e-mail, respondents have ample time to ponder responses, and many respondents can be reached simultaneously thereby making the results more reliable.

3.7 Data Collection Procedure

The questionnaire was self-administered because self-administered questionnaires are cheaper, quicker and generally more convenient for the respondent as well as for the administrator (Hawkes & Rowe, 2008). All the respondents were asked to respond to the same set of questions in a pre-determined order (Saunder, Lewis & Thornhill, 2009; Sekaran & Bougie, 2010). The secondary sources were used to collect data from published sources consisting of readily available books, reports, journals, filed documents and statistical statements. Documents on government policies, firms' past records, Kenya National Bureau of Statistics (KNBS), KAM records, and stakeholder reports such as annual reports and development partners provided more secondary sources.

Baylis, Smith and Owens (2011) used this approach for secondary data, collecting data from firms, filed documents, and statistical statements and past records that were

relevant to their study. Mahmood and Hanafi (2013) highlighted three methods of estimation, comparisons with known values for the population, subjective estimates, and extrapolation. This study used subjective method which entails the comparison of the data of high respondents with low respondents, and it is assumed that higher respondents have stronger characteristics to those of lower. Non-respondents were determined by following the guidelines of Mahmood and Hanafi (2013).

3.8 Pilot Study

According to Kombo and Tromp (2009), a pilot test is a rehearsal before the actual survey, to test the reliability and validity of the questionnaire. Cooper and Schinlder (2011; 2014) suggest that a 5% to 10 % sample size for the pilot test is adequate. On the other hand, Polit and Beck (2003) argue that the purpose of a pilot test is to test protocols and all aspects of the study in readiness for the actual study. Kelley, Clark, Brown and Sitzia (2003) propose that a research tool should be tested on a pilot sample of members of the target population who are not part of the accessible population. Mugenda (2008) proposes a 1% to 10% sample for pilot run. For this study, a pilot study was conducted to assess the questionnaire and modify it to suit the context of this study. Flaws, limitations, or other weaknesses were noted, and necessary revisions done prior to the implementation of the study (Lucky & Minai, 2011; Saunders, Lewis & Thornhill, 2009). This study used 21 firms from the manufacturing industry who were members of KAM. Compared to accessible population of 171 SME, the pilot sample size translated to 12%, well above proposed thresholds such as by Cooper and Schinlder (2014) and Mugenda (2008).

3.8.1 Reliability of Data Collection Instrument

The research conditions and the different sets of data are vital considerations while tackling reliability. Reliability may be enhanced variously through pilot tests, parallel forms reliability, inter-ratter reliability and test- retest reliability (Cozby, 2001). For this study, reliability and internal consistency were enhanced by generating the Cronbach's Alpha coefficient and test-retest (Cronbach, 1951; Tavakol, & Dennick, 2011).

The Cronbach Alpha is a common measure of internal consistency. It is mostly used when dealing with multiple Likert questions in a questionnaire. Zikmund et al. (2010) rate an Alpha score of above 0.8 as very good; that between 0.7 and 0.8 as good while that of 0.6 to just below 0.7 are considered as fair. On the other hand, test re-test gives the same test to the same group at different occasions and correlate the scores. By rule of thumb, scores of 0.9 and above indicate excellent reliability, those of between 0.8 and 0.9 indicate good reliability and those between 0.6 and 0.8 indicate acceptable reliability. This was vital to evaluate the consistency of the test across time.

3.8.2 Triangulation

Triangulation is the use of multiple methods, investigators, measures, methodologies or theories, on the assumption that any weaknesses of any single such element would be compensated by the strengths of others. Triangulation is a powerful alternative to traditional criteria like reliability and validity. Its purpose is to increase the credibility and validity of results (Rothbauer, 2008). This study used data and methodological triangulation where results were obtained using more than one tool from which they can be analysed, compared and judged for consistency and validity.

3.8.3 Validity of Data Collection Instrument

Validity is the accurateness of a measuring tool used for research (Cronbach, 1971). It can be divided into content validity, criterion-related validity and construct validity. Content validity is concerned with the inclusion of a sufficient number of study items and dimensions to capture the concept being studied. Construct validity on the other hand refers to how well the results of using the measure fit in to the theory which informed the study (Sekaran, 2003).

General data validity was achieved by ensuring that the data collection instruments are simple, unambiguous and contain variables for which data about SMEs was obtainable. It was enhanced by setting realistic goals, devising ways how results would be matched against objectives and review of the document by experts. Formative and criterion related validity have been achieved, for the method chosen produced more information in the study area and it would show current performance as well as predict future performance.

As Cronbach (1971) advices on sampling validity in a document, sampling validity has been perfected by planning a census and the consideration of multiple objectives. Face validity ensures that the measure chosen for analysing data in research answers the questions, objectives or hypothesis being tested (Moskal & Leydens, 2000). The study ensured face validity by choosing tested model best known for correlations.

3.9 Operationalization of Study Variables, Data Analysis and Presentation

This section show how variables were measured and their hypothesized direction. They are in the order of the objectives. Tables 3.1 to 3.4 categorizes all the variables, shows the indicators of each variable and shows the instruments used to measure each

of the variables. References to the previous studies as reviewed in section 2.2, which guided and informed the variables selection and measurement, are also given.

Table 3.1 Operationalization of Independent Variable

SME Characteristics References	Variable	Operational definition	Hypothesized direction
Charoenrat et al., (2013); Brown & O'Connor, (1995)	Size	Total assets Turnover No of employees	Higher the size, higher the efficiency.
Banerjee, (2014); Zhou, (2009)	Age	2016 minus year of registration.	The older the business the more efficient.
Sanda et al., (2011); Industry Canada, (2003).	Managerial competencies	Education Experience Innovation	Higher the managerial competencies, higher the efficiency

3.9.1 Measurement and Scaling Techniques

This study collected primary data through semi-structured questionnaires. There were closed questions, open-ended questions and 5-point Likert as well as 11-point Likert scale questions (Likert, 1932). Closed questionnaire affords a uniform frame of reference for respondents to decide their answers (Panneer Selvan, 2006; Weisberg & Bowen, 1977). Constructs used in the study were measured using established measures learnt from previous studies. Previous researchers who employed this technique include Mburiah, (2017); Mburiah et al. (2016); Aziz and Yasin (2010); Dess and Robinson (1984); Gupta and Govindarajan (1984) and Panneer Selvan (2006).

Mutunga, Minja and Gachanja (2014) used 5-point Likert scale in his study on Perceived Effects of Selected Macroeconomic Indicators on Sustainable Competitive Advantage in Kenya. Likert scaling is a unidimensional scaling method whose concepts are generally easier to understand because you only have either more or less of the same. Open-ended questions gave a chance to respondents to add information which may not have been included in the closed ended questions, while the Likert

scale, which is essentially an interval scale, was designed to examine how strongly subjects agree or disagree with a statement (Sekaran, 2009).

3.9.2 Measurement of Independent and Moderating Variables

Size was measured by total assets, turnover and number of employees (Charoenrat et al., 2013; Brown & O'Connor, 1995). Age was taken as 2016 minus year of registration (Banerjee, 2014; Zhou & Wit, 2009). Managerial competencies were measured by level of education, years of experience and level of innovation (Sanda et al., 2011; Industry Canada, 2003).

Alternative finance was taken as the average amount of all AF sources invested by the SME including sources such as personal savings; loan from family; retained earnings; microfinance institutions; SACCOs; table banking; hire purchase; lease finance; promissory notes; bills of exchange; trade credit; invoice trading; accruals & debt based securities; factoring; venture capital; business angel financing; peer-to-peer business lending and peer-to-peer consumer lending (Basterretxea & Martinez, 2012; Degryse, Lu & Ongena, 2015; Isaksson, 2002; Khedhaouria, Gurău, & Torrès, 2015; Kihimbo et al., 2012; Kochan, Bezrukova, Ely, Jackson, Joshi, Juhn, Leonard, Levine, & Thomas 2003; Petro, Annastazia, & Robert, 2014; Rauch, Wiklund, Lumpkin, & Frese, 2009; Ruirie, 2010; Tether, 2003).

Table 3.2: Operationalization of Moderating Variable Alternative Finance (AF)

References	Variable	Operational definition	Hypothesized direction
Kihimbo et al., 2012). Ruirie, 2010 Degryse, et al., (2015); Isaksson, (2002). Petro et al., (2014); Kochan et al., (2003). Khedhaouria et al., (2015); Rauch et al., (2009). Tether, (2003); Basterretxea and Martinez, (2012).	Alternative finance Cost. Culture and Social Demographics. (CSD) Entrepreneurial Orientation (EO)	Personal savings Venture Capital Microfinance Interest paid Opinion on cost of finance. Age preferences Changes in the proportion of genders different racial, religious, social and ethnic groups. Risk attitude Pro-activeness Innovation	Higher the level of reliance on AF, higher the efficiency Higher the cost of AF, lower the efficiency and vice versa. Higher the (CSD) proportion, higher the efficiency Higher the EO higher the efficiency.

3.9.3 Measurement of Dependent Variable

Efficiency was the dependent variable in this study, having values ranging between zero (0) and one (1) as calculated by use of the Data Envelopment Analysis (DEA) input-output model as specified by Charnes et al. (1978). Inputs and outputs are identified as specified in the operationalization Table 3.3. For inputs, production costs, staff costs and operating expenses were used while production, gross profit and ROI, were applied as outputs as shown in Table 3.4.

3.9.3.1 Measurement of Efficiency of SMEs

The DEA input-output model as specified by Charnes et al. (1978) was utilized with input and output variables as specified in the operationalization Table 3.3 and 3.4. The results were data points for each of the sampled SMEs having values ranging from 0 to 1. (Zero to one)

The DEA model inputs were production costs, staff costs, operating expenses and finance costs. Other operating costs (such as manufacturing costs and borrowing costs) may also be considered. Outputs were Production, profits (gross profit) ROI, EPS and dividends. The variables selection is informed by previous studies as reviewed in sec-

tion 2.2. The variables in the relationship between efficiency and various factors are as shown in Table 3.1 to 3.4. To address these issues, the study did a census of SMEs registered under the KAM, the choice of inputs and outputs and their measurement was informed by an extensive review of literature.

Table 3.3: Operationalization of Dependent Variable - Inputs

References	Variable	Efficiency -Inputs	
		Operational definition	Hypothesized direction
	Production costs	<ul style="list-style-type: none"> • Labour; Raw materials, • Consumables & general overhead 	Lower the production costs, higher the efficiency.
Coelli et al., (2005); Neely et al., (2001).	Operating expenses	<ul style="list-style-type: none"> • Rent; Equipment • Inventory; Marketing • Staff/Payroll • Insurance; R & D • Sales and Distribution 	Lower the operating expenses, higher the efficiency.
	Finance costs	<ul style="list-style-type: none"> • Interest payment • Financing fees • Facilitation charges 	Lower the Finance costs higher the efficiency.

Table 3.4: Operationalization of Dependent Variable - Output

References	Variable	Efficiency – Outputs	
		Operational definition	Hypothesized direction
Farinas & Martin-Marcos, (2002); Aw et al., (2000); Coelli et al., (2005); Neely et al., (2001).	Production	Total output of a firm	Higher the production higher the efficiency.
	ROI. (Return on investment)	Net Gain from $\text{ROI} = \frac{\text{Investment}}{\text{Cost of Investment}}$	Higher the ROI ratio, higher the efficiency.
	Gross profit	Gross profit margin $\text{GP} = \frac{\text{Gross Profit}}{\text{Turnover}} \%$	Higher the gross profit margin, higher the efficiency.
	EPS	Earnings/No of shares	Higher the EPS, higher the efficiency

3.10 Statistical Models and Hypothesis Testing

In analysing data and testing of hypothesis, various statistical models were used. The data was analysed in three steps. In the preliminary stage, various descriptive statistics were computed: Relationship, direction, strength of relationship (Pearson's Product

Moment coefficient) and multicollinearity (Hair, Black, Babin, & Anderson, 2010).

The second stage involved applying the DEA model adopted from, Charnes et al. (1978), to measure efficiency, thereby responding to the first objective. In the final step, hypotheses tests were done to address study objectives two to five.

To enhance the understanding of the data collected, various descriptive statistics were computed, including arithmetic mean, standard deviation and coefficient of variation about all measures of SME characteristics, AF of SMEs, and efficiency. The statistics adequately summarize the study data. They also provide an indication as to how the SMEs are distributed along diverse variables.

3.10.1 DEA Model

The statistical packages Open Source Data Envelopment Analysis Program (DEAP version 2.1) and IBM SPSS Statistics 2015 were used. DEA being the most appropriate nonparametric model, given the nature of the data. It is widely used and gives reliable relativity output. Statistical package for social sciences is a versatile and robust statistical operations tool, providing solutions for data entry, cleaning, coding, management, data documentation, mostly for quantitative data.

Objective I

Equation 3. 1: DEA Statistical Model for Efficiency Maximize

$$E_I = \text{Maximize } \sum_{k=1}^m U_k Y_{ki} / \sum_{j=1}^n V_j X_{ji} \quad \dots \quad 3.1$$

Subject to:

Equation 3.2: DEA Statistical Model for Efficiency Subject

$$E_I = \text{Maximize } \sum_{k=1}^m U_k Y_{ki} / \sum_{j=1}^n V_j X_{ji} = < 1, \text{ for } it = 1, \dots n \text{ and } V_j \geq 0 \dots \quad 3.2$$

Where:

m = number of outputs for each SME using n different inputs;

n = number of inputs used by each SME to produce m different outputs;

y_{ki} = is the amount of the k^{th} output for the i^{th} SME;

x_{ji} = is the amount of the j^{th} input used by the i^{th} SME;

u_k = is the output weight;

v_j = is the input weight,

3.10.2 Bivariate Analysis

Bivariate data means two variables or two sets of data, X, and Y, or predictor and response variables. The prefix bi means two while variate stands for variable. Bivariate data implies comparison of two sets of data. Bivariate analysis is a form of quantitative statistical analysis of two variables (Babbie, 2009). Bivariate data can be presented on a two-way frequency table with joint frequencies and marginal frequencies. It can also be presented on a scatter plot which demonstrates the association or relationships otherwise hidden in a two-way frequency table. A scatter plot will also reveal outliers in the data set by physical inspection.

Another way to analyse bivariate data is by linear correlation analysis, where a line of best fit is plotted, using the least squares method. Assigning either of the data to the X axis and the other data set to the Y-axis, a line of best fit with gradient r will demonstrate either a negative correlation (line sloping downwards from left to right) or a positive correlation (line sloping upwards from left to right). The sign of the gradient r (correlation coefficient) indicates the direction of the slope, either positive or negative, while its proximity to zero or absolute 1 indicates the strength of association.

Still another way to analyse bivariate data is by linear regression analysis, where one of the data set is used to predict the other. The predictor variable becomes X while the response variable is Y. Running a regression of Y on X will take the form $y = a + b*x$.

Linear regression gives a more direct relationship of the data, and how available values of X may be used to approximate or predict values of Y. It can be shown that r square represents the extent of or percentage of variations in Y explained by the equation. The higher the R-square, the more precise the prediction. However, although bivariate and multivariate analysis are central to study of causal relationships, regardless of the strength of prediction, bivariate linear regression does not imply causal relationship.

Multiple linear regression remains a bivariate analysis, since there is only one response variable (Babbie, 2009). Bivariate analysis is a special case of multivariate analysis where multiple relations between multiple variables are examined simultaneously (Babbie, 2009; Chatterjee, 2012).

Hair et al. (2010), Tabachnick and Fidell (2007) explain bivariate analysis as all statistical techniques which analyse measurement of relationships between one or more explanatory variables and one response variables. Bivariate analysis deals with direction, form, and strength of two sets of quantitative data. Direction may either be positive or negative, while form is represented by linear, curving up or curving down. Strength of association may be represented as strong, moderate or weak. Scatterplots, linear correlation and linear regression both simple and multiple are examples of bivariate analysis.

Multiple Linear Regression fits a single line through a multidimensional space of data points and can be used to: Identify the strength of the effect that the independent variables have over the dependent variable; forecast effects or impacts of changes; predict trends and future values. According to Hair et al. (2010), multiple regressions solve two main items, prediction – the extent to which the regression variate(s) can predict the dependent variable and explanation –examining the regression coefficients of each

independent variable, e.g. their magnitude, sign and statistical significance (Hair et al., 2010), Tabachnick, & Fidell, 2007). These multivariate methods are vital in this research.

Tabak (2004) underscores the importance of statistical analysis and states that, “Correlations, not explanations, however, are what statistical research excels at revealing” (Tabak, 2004, p.171). Data analysis involves editing, coding, classifying, and tabulating (Cooper & Schindler, 2011; 2014). Both qualitative and quantitative data were used in this study, necessitating the use of a mixture of tools in data analysis. Where Likert - type scale was used, a range of 1 to 5 was sustained.

Where ordinal scales were used, 1 and 0 were used to represent “Yes” and “No” respectively. To achieve maximum possible data quality levels, the completed questionnaires were edited for omissions and errors. The study ensured that the data was accurate in line with other facts gathered, that questionnaires were properly arranged, filed, and labelled. Variables were defined, responses labelled, and numbers assigned to all possible responses, before data was input into SPSS version IBM Statistic 20 and or DEAP, Version 2.1 ready for analysis.

Agresti (2013) elucidating on the analysis of categorical response variables points out that while ordinal variables are categorical variables which have ordered scales, those categorical variables with unordered scales are called nominal variables (Cerny & Keiser, 1977). Categorical variables are qualitative and not quantitative (numerical-valued) in nature (Agresti, 2013).

Scott (2009) as well as Mwangi (2014) both suggests the use of Sturge’s rule to estimate the optimal number of classes in a frequency distribution. This number is given by the formula $k = 1 + 3.322 (\log_{10} n)$, where k is the number of classes and n

is the number of units of analysis. In our case, given that $n = 136$, then: $k = 1 + 3.322 (\log_{10} 136)$, $K = 8$. Although a researcher is given freedom to consider the nature of data being summarised and vary the classes as necessary, this research adopted the Sturge's rule to estimate the optimal number of classes in the frequency distribution (Scott, 2009; Mwangi, 2014).

For hypothesis testing, the study employed multiple linear regression (MLR) which assumes a continuous dependent variable. Multiple Linear Regression (MLR) model. MLR is good for scale data types and has minor limitations. All the assumptions of MLR should be tested and should hold. The model was carefully chosen considering type of final data. Further, for hypotheses two to five, the study employed Hierarchical Multiple Regression (HMR) model fitting strategy using Moderated Multiple Regression (MMR). MMR is a type of regression model that have moderator variables and their interactions with other predictor variables. In our case, (HMR model 1, 2 & 3) in the step-wise MMR were adopted to find out whether including certain predictors and moderator impact R^2 (the predictive power of the equation) sufficiently or not.

Agresti (2013) posits that a categorical variable has a measurement scale consisting of a set of categories, mainly for measuring attitudes and opinions. The response or dependent variable is (y) and the explanatory/independent variable is (x) Ordinal variables are those categorical variables having ordered scales. Nominal variables are categorical variables which have no ordered scale (Agresti, 2013).

Objective one was to evaluate the operational efficiency of SMEs in Kenya. In testing hypothesis two to five, if computed p-value $<$ the level of significance, then the null hypothesis must be rejected. Consequently, it would be concluded that a relationship does exist. The respective slope coefficients were also tested individually for their sta-

tical significance using the t-test to find out if the score falls within or without the acceptable region of the two-tailed test on the normal curve; R^2 (coefficient of multiple determination). Coefficient of determination also called R-square is the square of the correlation coefficient. Its values lie between zero and +1 and represent the percentage variation in Y (dependent variable) which is explained by the X (predictor) variables. This demonstrates the power of the model to explain the behaviour of the dependent variable.

On the other hand, correlation coefficient is the numerical measurement of the strength of a linear association between two quantitative data sets. It is denoted by r which lies between +1 and -1 calculated to represent the direction, form and strength of the linear interdependence of two variables or sets of quantitative data. While 0 indicates no relationship. +1 shows perfect positive linear relationship and thus as one variable increases in value, the other one also increases in value. On the other hand, -1 shows perfect negative linear relationship, thus as one variable increases in value, the other one decreases in value.

3.10.2.1 Hypothesis Testing Using Multiple Linear Regressions (MLR)

Multiple Linear Regression. The study adopted a hypothetical stance for each one of the objectives. To test this thought, the study employed a 3 steps hypothesis testing process below:

- i. State the null hypothesis and the alternative
- ii. State the relevant test statistic: Test statistic is the p-value (The probability of obtaining an effect at least as extreme as the one in the sample, if the null hypothesis holds)

- iii. State the decision criteria: if computed p-value < the level of significance, then the null hypothesis is rejected, accepting the alternative. Otherwise accept null hypothesis, rejecting the alternative.

3.10.2.2 Hypothesis Testing Using Step-wise Moderated Multiple Regression

In their research on multiple regression - testing and interpreting interactions Aiken and West (1991) indicated that the Moderated Multiple Regression approach involves the addition of interaction effects to a multiple regression model by comparing two different least square regression equations. To evaluate the moderating influence of alternative finance on the relationship between predictor variables and the dependent variable.

Step 1: Apply the Multiple Linear Regressions (MLR)

Step 2: Apply the moderator to the MLR in step 1 above

Step 3: Multiply the significant Multiple Linear Regressions variables in step 2 with the moderator. In step 3, the overall model should be significant in addition to F and at least one of the predictor variables.

3.10.2.2 (a) Step-wise MMR for Objective Two

To determine whether size influence the efficiency of SMEs in Kenya

The null hypothesis and the alternative were:

$H_{02,s}$: Size has no significant influence on efficiency of SMEs in Kenya,

$H_{12,s}$: Size has significant influence on efficiency of SMEs in Kenya,

The multiple regression models to relate components of firm size to efficiency are:

Step 1:

(Adapted from Helm, & Mark, 2012), Where:

E_i = Efficiency of SME i (Where, $0 \leq E_i \leq 1$);

α_i = Intercept, a sample-wide constant;

$T_i = \ln S_i$ = natural logarithm of total assets in SME_i (size);

$O_j = \text{Turnover of SME}_j;$

Y_i = Number of employees in SME_i;

ε_j = error term;

βt_i , βo_i , βm_i = coefficients for the respective determinants;

$i = 1$ -*to- n where there are n observations.

Step 2:

Equation 3.4: Interaction of Moderator in Multiple Regression Model for Efficiency on Firm Size

Where:

Ei, T_i, O_i, Y_i , = as defined in equation 3.3;

α_{21} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{21} = error term

$\beta t_{21}, \beta o_{21}, \beta \gamma_{21}, \beta af_{21}$ = coefficients for the respective determinants.

Step 3:

Equation 3.5: Alternative Finance Moderated Multiple Regression Model for Efficiency on Firm Size.

Where:

Ei, T_i, O_i, Y_i , = as defined in equation 3.3

α_{22} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{22} = error term; $\beta t_{22}, \beta o_{22}, \beta y_{22}, \beta af_{22}$ = coefficients for the respective determinants;

β_{taf} , β_{oaf} , β_{yaf} , = coefficients that indicate moderation.

3.10.2.2 (b) Step-wise MMR for Objective Three

To establish whether age Influences efficiency of SMEs in Kenya

The null hypothesis and the alternative were:

$H_{03,G}$: Age has no significant influence on efficiency of SMEs in Kenya,

$H_{12,G}$: Age has significant influence on efficiency of SMEs in Kenya,

The regression models to relate firm age to efficiency are:

Step 1:

Equation 3.6: Regression Model for Efficiency on firm age

(Adapted from Helm, & Mark, 2012), Where:

E_i = Efficiency of SME i (Where, $0 \leq E_i \leq 1$);

α_i = Intercept, a sample-wide constant;

$$G_i = \text{Age of SME}_i;$$

ε_i = error term; βg_i = coefficients for the respective determinants;

$i = 1 \text{--} * \text{to-} n$ where there are n observations.

Step 2:

Equation 3.7: Alternative Finance Moderated Multiple Regression Model for Efficiency on Firm Age

Where:

$Ei, G_i,$ = as defined in equation 3.6;

α_{21} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{21} = error term

$\beta g_{21}, \beta af_{21}$ = coefficients for the respective determinants.

Step 3:

Equation 3.8: Alternative Finance Moderated Multiple Regression Model for Efficiency on Firm Age.

Where:

Ei, G_i = as defined in equation 3.6

α_{22} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME

ε_{22} = error term; $\beta g_{22}, \beta af_{22}$ = coefficients for the respective determinants;

βgaf ,= coefficients that indicate moderation.

3.10.2.2 (c) Step-wise MMR for Objective Four

To find out how managerial competency influences efficiency of SMEs in Kenya

The null hypothesis and the alternative were:

$H_{04,M}$: Managerial competency has no significant influence on efficiency of SMEs in Kenya,

$H_{14,M}$: Managerial competency has significant influence on efficiency of SMEs in Kenya,

The multiple regression models to relate components of managerial competency to efficiency are:

Step 1:

Equation 3.9: Multiple Regression Model for Efficiency on Managerial Competency

(Adapted from Helm, & Mark, 2012), Where:

E_i = Efficiency of SME i (Where, $0 \leq E_i \leq 1$);

α_i = Intercept, a sample-wide constant;

X_i = Experience of management of SME_i

U_i = Education of management of SME_i;

I_i = Innovativeness of management of SME_i;

ε_i = error term; βx_i , βu_i , βi_i = coefficients for the respective determinants;

$i = 1$ -*to- n where there are n observations.

Step 2:

Equation 3. 10: Alternative Finance Moderated Multiple Regression Model for Efficiency on Managerial Competency

Where:

$Ei, X_i, U_i, I_i,$ = as defined in equation 3.9;

α_{21} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{21} = error term

$\beta x_{21}, \beta u_{21}, \beta i_{21}, \beta af_{21}$ = coefficients for the respective determinants.

Step 3:

Equation 3. 11: Alternative Finance Moderated Multiple Regression Model for Efficiency on Managerial Competency.

Where:

Ei, X_i, U_i, I_i , = as defined in equation 3.9

α_{22} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{22} = error term; $\beta x_{22}, \beta u_{22}, \beta i_{22}, \beta af_{22}$ = coefficients for the respective determinants;

$\beta xaf, \beta uaf, \beta iaf$, = coefficients that indicate moderation.

3.10.2.2 (d) Step-wise MMR for Objective Five

To evaluate the moderating influence of alternative finance on the relationship between characteristics and efficiency of SMEs in Kenya.

The null hypothesis and the alternative were:

$H_{05,R}$: Alternative finance has no significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya.

$H_{15,R}$: Alternative finance has significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya.

The dependent - independent variables relationship models used to relate firm characteristics and efficiency were:

Step 1:

Equation 3.12: Multiple Regression Model for Efficiency on SME Characteristics

(Adapted from Helm, & Mark, 2012), Where:

E_i = Efficiency of SME i (Where, $0 \leq E_i \leq 1$);

α_i = Intercept, a sample-wide constant;

$S_i = \text{Log } S_i = \text{natural logarithm of total assets of SME}_i (\text{size});$

$$G_i = \text{Age of SME}_i;$$

M_i = Managerial competency of management of SME_i;

ε_i = error term; βs_i , βg_i , βm_i = coefficients for the respective determinants;

$i = 1$ -*to- n where there are n observations.

Step 2:

Equation 3.13: Moderated Multiple Regression Model for Efficiency on SME Characteristics.

$$Ei = \alpha_{21} + \beta s_{21} S_i + \beta g_{21} G_i + \beta m_{21} M_i + \beta a f_{21} A F_i + \varepsilon_{21} \quad \dots \dots \dots \quad 3.13$$

Where:

Ei, S_i, G_i, M_i , = as defined in equation 3.12

α_{21} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{21} = error term

$\beta s_{21}, \beta g_{21}, \beta m_{21}, \beta af_{21}$ = coefficients for the respective determinants.

Step 3:

Equation 3. 14: Alternative Finance Moderated Multiple Regression Models for Efficiency on SME Characteristics.

Where:

Ei, Si, Gi, Mi , = as defined in equation 3.12;

α_{22} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{22} = error term; $\beta s_{22}, \beta g_{22}, \beta m_{22}, \beta af_{22}$ = coefficients for the respective determinants;

$\beta saf, \beta gaf, \beta maf$, = coefficients that indicate moderation.

3.10.3 Multivariate Analysis

Multivariate analysis (MVA) is a quantitative statistical endeavour to study interrelationships of more than one variable simultaneously. Hair et al. (2010); Tabachnick and Fidell (2007) define multivariate analysis as all statistical techniques which simultaneously analyse multiple measurement on individuals or objects under investigation. Multivariate studies solve problems irrelevant in univariate analysis.

According to Babbie (2009); Chatterjee (2012), bivariate analysis, is a special case of multivariate analysis. Multivariate analysis can be applied in areas like medical studies, pathological studies, criminology, social demographics, social sciences and in economics. Broadly, MVA application objectives are in solving problems relating to classification of individuals, dimension reduction and cause-effect analysis. Although more informative as compared to univariate analysis, it borrows therefrom and is more complex.

MVA solves grouping of individuals' problem through cluster analysis, discriminant analysis and classification. MVA tackles dimension reduction by principal component analysis, factor analysis and also canonical correlation. In cause and effect analysis, regression analysis of a single response variable, regression analysis of multiple response variables, ANOVA- Analysis of variance, ANCOVA-analysis of covariance, multivariate analysis of variance, multivariate analysis of covariance may be per-

formed. Apart from bivariate analysis, multivariate analysis presumes multiple response variables.

3.10.3.1 Analysis of Variance (ANOVA)

This study obtained respective ANOVA tables of a multiple regression runs of dependent variable on moderator and predictor variables. Two-way analysis of variance (ANOVA) isolates systematic data variability separate from random variability in data sets. It establishes the type of relationships between and among multiple data sets by use of the systematic variability.

For the ANOVA table, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus $R^2 = 0$). Establish if the F-test statistic is significant. If so, the model has moderating power. Obtain a coefficient of multiple regression run table of dependent variable on the moderator and dependent variables. For the coefficients table, observe significant coefficients and decide on whether to accept or reject the null hypothesis at that level.

3.10.3.2 Principal Component Analysis

Principal component analysis statistical procedure was undertaken by use of the SPSS tool to determine orthogonal relations of predictor variables. To determine how many features to keep and how many to drop, three methods avails. One, arbitrary, where the researcher just picks a number, two, calculate the cumulative proportion the study wants explained, usually starting with features with the largest explained proportion. Third, the researcher may calculate the proportion of variance he wants explained from a screen plot. Usually called “find the elbow method, looking at the bend in the screen plot where the biggest drop in proportion of variance explained occurs.

Another option is to pick for use, components with a certain threshold of loading and drop the others. This study accepted components with a factor loading of 0.4 and above as a rule of thumb, dropping those with a loading below 0.4, and thereby eliminating redundancies in the variables. Initially, the factors had been named by identifying selected themes which when viewed as a set represent a construct.

3.11 Data Analysis and Processing

The study analysed data in three steps. In the preliminary stage, relationship, direction, strength of relationship and multicollinearity were tested (Pearson Product Moment Coefficient). Various descriptive statistics were computed and interpreted. The second stage involved applying the DEA model to measure the efficiency of SMEs ranging between 0 and 1. In the final step, the study objectives were addressed. Here, the study used Multiple Linear Regression (MLR) - a regression analysis model applicable where there are more than one predictor variables.

Hierarchical Moderated Regression (HMR) was used to test incremental effect of moderator variables. All tests for this study are two-tailed-tests done at 0.05 significant level or 95% level of confidence for uniformity and comparability (Freedman, 2005). Thus, the alpha level (α - the probability of rejecting the null hypothesis when it is true) = 5%. This level of significance has been applied in prior studies in the same thematic area. Such studies as Kiai (2016); Kiai et al. (2016); Magutu, (2013); Mburiyah, (2017); Mburiyah, et al. (2016); Mwangi, (2014); Muchemi (2013) also used one-way ANOVA at the same confidence level in their research works.

On model diagnostics, this study tested normality, multicollinearity, heteroscedasticity and autocorrelation, common method bias (CMB), Non-Response Bias (NRB), and analysis of variance (ANOVA) test. Normality is important in knowing the shape of

the distribution and helps to predict dependent variables scores (Paul & Zhang, 2009).

In statistics, the Gauss-Markov theorem states that in a linear regression model in which the errors have expectation zero and are uncorrelated, and have equal variances, the best linear unbiased estimator (BLUE) of the coefficients is given by the Ordinary Least Squares (OLS) estimator, provided it exists. Recognising that the linear regression model used for this study adopts the assumptions of the Gauss-Markov theorem, then this research run some model diagnostics (Greene, 2012). The assumptions which concern the set of error random variables are:

They have mean Zero; they are homoscedastic; distinct error terms are uncorrelated; linear – that the estimators are linear combinations of variables X and Y; unbiased – That the estimator is generally on target, given that the target is a population parameter and best – The best estimator will not only be the best but also returns minimum variance (Wilkinson, 2005).

3.11.1 Test of Normality

Normality tests are used to determine if a data set is well modelled by a normal distribution and to compute how likely it is for a random variable underlying the data to be normally distributed. Tests for normality include Kolmogorov-Smirnov test, kurtosis, Skewness, scatter diagrams and Shapiro-Wilk test. The Kolmogorov-Smirnov test K-S test is a nonparametric test of the equality of continuous, one-dimensional probability distribution that can be used to compare a sample with a reference probability distribution two samples. It can be modified, by standardizing the sample, to represent a goodness of fit test.

The Shapiro-Wilk test shows if a random sample comes from a normal distribution (Shapiro & Wilk, 1965; DeCarlo, 1997). It gives a W-value, where small values be-

low certain thresholds would indicate that the sample is not normally distributed. This would lead to rejection of the null hypothesis that the population is normally distributed, in favour of the alternative. This study used Shapiro-Wilk test, Kurtosis, and Skewness tests because they are widely accepted and easy to use as shown in Table 3.5).

Table 3. 5: Test of Normality Criteria

NO	TEST	Measure	Criteria	Conclusion
1	Kurtosis	Moment coefficient	3 Sigma K>3, Clean sample data	George and Mallery (2010); DeCarlo, (1997)
2	Skewness	Moment coefficient	0	Rule of thumb: up to 0.5- Symmetric. Between 0.5 and 1- moderate skew; above 1- highly skewed.
3	Shapiro-Wilk Hypothesis	W-value	P<.05	Reject null hypothesis if p>.05; Shapiro, & Wilk, (1965).

3.11.2 Test for Multicollinearity

Multicollinearity or Collinearity is a phenomenon where a predictor variable in a multiple regression model may be linearly predicted from the others with reasonable accuracy. Although multicollinearity does not reduce the predictive power or reliability of the model, it shows redundant predictor variables. In the presence of multicollinearity, the estimate of a variables' impact on the independent variable while controlling for all other variables tends to be inaccurate. The study used the Variance Inflation Factor (VIF) to detect multicollinearity (Brien, 2007).

Equation 3.15 Collinearity Tolerance

$$\text{Tolerance} = 1 - R_j^2 ; VIF = \frac{1}{\text{Tolerance}}$$

Where R_j^2 is the coefficient of determination of the regression of explanator j on all the other “explanators” A tolerance of less than 0.20 and a VIF of 5 and above indi-

cate a multicollinearity problem. Dropping one variable, or obtaining more data are some of the remedies for multicollinearity.

3.11.3 Test for Heteroscedasticity

Where the ordinary least squares regression analysis assumption that the error term has a constant variance is not met, heteroscedasticity is said to exist. Heteroscedasticity refers to a circumstance in which the variability of a variable is unequal across the range of values of a second variable that it predicts. This study did a Cook-Weisberg test. For corrections where necessary, options include logarithmical data; weighted least squares; none linear transformation; or HCSE (Homoscedasticity-Consistent Standard Errors). There were no corrections necessary for this study though (Breusch & Pagan, 1979).

3.11.4 Autocorrelation or Serial Correlation

Autocorrelation or serial correlation is a mathematical representation of the degree of similarity between a given time series and a lagged version of itself over successive time intervals. It refers to the correlation of a time series with its own past and timed future values at given intervals (Box & Jenkins, 1976). The autocorrelation function can be used to detect non-randomness in data and in time series modelling. Autocorrelation is essentially a correlation coefficient, but instead of correlating between two different variables, the correlation is between two sets of values of the same variable at different times, X_i and X_{i+k} . In regression analysis OLS, the adequacy of a model specification can be checked in part by establishing whether there is autocorrelation of the regression residuals. This study used the Durbin-Watson statistic.

The traditional test for presence of autocorrelation is the Durbin-Watson test statistic (Durbin & Watson, 1971). Further, the Durbin-Watson statistic can be mapped to the Pearson correlation between values and their lags. The presence of autocorrelation of the errors violates the ordinary least squares assumption that the error terms are uncorrelated, meaning that the Gauss Markov theorem does not apply, and that OLS estimators are no longer the Best Linear Unbiased Estimators (BLUE). For implementation, calculation of the statistic is included as an option in the regression function in SPSS (Field, 2000). In regression analysis, the function of correlation has the advantage of giving a sensible, well defined single-parameter for periodic functions, even when those functions are not the output of stationary ergodic processes. Further, multidimensional correlations are possible. Other favourable properties include computational efficiency, symmetry, even function, and good estimator.

3.12 Test of Robustness of Models Adopted

This study found it necessary to do a robustness test by employing an alternative model, the Partial Least Squares Structural Equation Modelling (PLS-SEM). This was because some of the data was converted from ordinal to continuous. It is possible to have spurious results even where stringent LP assumptions on normality have been met. Even though PLS-SEM basically employs an LP analysis approach, it relaxes the stringent Ordinary Least Squares (OLS) preconditions while still retaining its relevance (Kline, 2011).

The robustness tests were particularly in relation to direction of relationship, strength of relationship, significance and proximity of beta values. Mburiah (2017) doing a study on the same thematic area took a similar approach. The structural equation modelling was conducted using the PLS to construct a conceptual model linking the variables under study. This study followed the two-step approach for SEM that is, the

confirmatory measurement model and the confirmatory structural model as outlined by Anderson and Gerbing (1988). Sirivanh and Sukkabot (2014) adopted the two stage SEM approach consisting of confirmatory measurement model and confirmatory structural model in their study, as did Byrne (2010) and Ndung'u, Wanjau, Gichira and Mwangi (2014).

3.13 Ethical Issues

Ethics has to do with a culture considered correct or moral values of human conduct (Webster's Dictionary, 2010). Cooper and Schindler (2011; 2014) view ethics as the principles or norms governing moral choices of a researcher while dealing with his subjects (Ferzan & Morse, 2016). Several normative philosophical ethical views avail for choice. The deontological view, the teleological or consequentialism, pragmatics and the virtue ethical consideration.

While the deontological theory uses rules to distinguish right from wrong, consequentialism judges' actions by their results. Still, virtue ethics emphasize qualities of mind and character while pragmatics belief that morals can change with inquiry and science. However, contemporary theory leans heavily on deontological view, giving priority to the right over the good, in contrast to teleological or utilitarian views that give priority to the good over the right (Kymlicka, 1988; Cooper & Schindler, 2011, 2014; Kiai, 2016).

The study adopted a deontological stance to maintain a high level of integrity based on rules. The questionnaire for this study neither delved into any deceptive questions nor innuendos. All data collected was used only for the study. Confidentiality was maintained during the research. Permission was sought from relevant authorities to administer the questionnaire. Approval for the study was obtained from Karatina Uni-

versity, Kenya Association of Manufacturers and National Commission for Science Technology and Innovation (NACOSTI) and respective county offices. Data and information obtained was treated with confidentiality to safeguard the privacy of respondents.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents data analysis, findings, and interpretation. The response rate, summary of sample characteristics, reliability test results, qualitative analysis of open ended questions, calculation of efficiency for SMEs, and finally the hypotheses tests for specific objectives were undertaken. Statistical tools and approaches such as data envelopment analysis, triangulation, exploratory factor analysis and moderated multiple regression were systematically applied to provide inclusive and conclusive findings on available data and afford hypotheses tests for specific objectives.

The work in this chapter is organized into introduction, descriptive statistics in composing of SME demographics and characteristics of respondents. Also, descriptive analysis of study variables is presented, test of assumptions and findings on determination of SMEs efficiency. Finally, hypothesis testing is presented.

4.1 Descriptive Statistics

All descriptive constructs aligning objectives to hypotheses and models are described and defined in Appendix 11 for ease of flow. The abbreviations of the constructs and measure variables were used in the consecutive sections as indicated in Appendix 11. This description was quite helpful in cross referencing since the factors were used in data analysis, model analysis, and throughout the entire study. The study had 27 constructs divided into 4 parts, each with a unique number of factors.

4.1.1 Response Rate

A questionnaire was administered to 171 organizations out of which 137 responses were received, indicating a response rate of 80% as shown in Table 4.1. This response rate compares well with available thematic literature. For example, Mwangi (2014) reported a response rate of 67%, Kiai (2016) a response rate of 91.8%, and Mburiah (2017); Mburiah et al. (2016), a response rate of 94.37%.

While Hager, Wilson, Pollack and Rooney (2003) consider a 50% response rate as acceptable, Mugenda (2008) suggests that a response rate of 50% or more as adequate for analysis and publication, 60% and above as good and above 70% as very good. Further, this also corroborates the assertions of Bailey (2008) that a response rate of 50% is adequate while a response rate greater than 70% is very good. High response rates are very vital because they help to ensure that survey results are representative of the target population thus assuring accurate and useful results. One respondent was adjudged non-responsive, owing to size.

Table 4. 1: Questionnaires Response Rate

Administered Questionnaires	Response		No Response	
	No.	Percentage (%)	No.	Percentage (%)
171	137	80	34	20

4.1.2 Validity Checks

For this study, validity checks employed included a pilot study, internal consistency checks and reliability tests. Each is considered briefly below.

4.1.2.1 Pilot Study

According to Kombo and Tromp (2009), a pilot test is a rehearsal before the actual

survey, to test the reliability and validity of the questionnaire. Cooper and Schinlder (2011; 2014) suggest a 5 to 10 % sample for the pilot test. A pilot test, of fifty (50) manufacturing firms to whom questionnaires were administered was done. The pilot received a (42%) response rate with 21 firms. In Appendix 8, a summary of pilot run findings is given. SPSS and DEA were used. Reliability, validity, efficiency, model test, normality, multicollinearity and heteroscedasticity were tested. As presented in Appendix 8, the pilot run gave acceptable results as well as gave insights on areas of improvement before the actual run.

Polit and Beck (2003) argue that the purpose of a pilot test is to test protocols and all aspects of the study in readiness for the actual study. In this spirit, the pilot revealed areas where the questionnaire required amendments to enhance reliability. Some of the highlights include the need for data cleaning, the need for a census to enhance the R^2 of the model, the need to rearrange the questionnaire to flow sequentially per objective/conceptual framework and ideas to enhance and improve the response rate.

Other improvements to the questionnaire included: Consider component analysis outcome and eliminate redundancies to enhance reliability; endeavour to administer walk-in questionnaire to create personal touch; develop a good rapport to enhance response rate; train data collection team in depth as far as possible; consult data collection experts; reduced questions from 21 to 19 to enhance construct validity.

In Appendix 8, for the pilot test sample; Cronbach's alpha value was above 0.70, below maximum of 0.905; test retest correlations above 0.6 with maximums of 0.845; KMO acceptable at .752 (Hair et al., 2010; Argyrous, 2005); Bartlett's Test significant at 0.002 Shapiro – Wilk normality tests $Sig \geq .05$; tolerance; 0.979 and 0.839 VIF acceptable between 1.194 and low of 1.021; and an acceptable Breusch -Pagan test against multicollinearity range of between 0.839 and 0.979, which are close to 1. Var-

iance Inflation Factor (VIF) range between 1.021 and 1.194.

These values are below 5, the suggested cut-off score, thus there is then no risk of multicollinearity. Since tolerance ranges between .796 and .959 and the closer to 1 (one) the better, there is no apparent risk of multicollinearity. Results of Breusch-Pagan / Cook-Weisberg shows that the Lagrange multiplier constant variance (Chi-square= .855) is not statistically significant ($P > 0.05$). Thus, fail to reject the null hypothesis and conclude that the error variance is equal thus, heteroscedasticity is absent (Appendix 8).

4.1.2.2 Internal Consistency

The Cronbach Alpha is a common measure of internal consistency. It is mostly used when dealing with multiple Likert questions in a questionnaire. Zikmund et al. (2010); Tavakol, and Dennick (2011) rate an Alpha score of above 0.8 as very good; that between 0.7 and 0.8 as good while that of 0.6 to just below 0.7 are considered as fair. Here, the study sought to determine if the scale is reliable. Reliability and internal consistency were enhanced by generating acceptable thresholds of the Cronbach's Alpha coefficient (0.70) and test-retest results above 0.6 with maximum score of 0.845 as shown in Appendix 8 (Cronbach, 1951).

4.1.2.3 Reliability Test Results

To assess the reliability of the variables measured using Likert-scale, reliability coefficients were computed for each Likert-scale item and the results are presented in Table 4.2. Reliability coefficients in Table 4.2 show that the coefficient Alpha ranged between 0.699 and 0.719. All values were above the cut-off rate of 0.6 suggested by Hair et al. (2010). This indicates that all the Likert-scale type questions were reliable.

Therefore, the findings from such questions may be used for further analysis in the study.

Table 4.2: Reliability Test Results

No	Factor	Number of measures (Subjects)	Cronbach Alpha coefficient	
			Pilot results	Final results
1	Alternative finance - Culture, demographics	7	0.716	0.716
2	Alternative finance -Informal sources	7	0.775	0.7
3	Managerial competency Innovation and risk	5	0.736	0.699

4.2 SME Demographics and Characteristics of Respondents

To gain deeper understanding of the firms, it was found necessary to gather some details on the characteristics of the respondents. Legal form, sub-sector, gender, age group, and role of local business association were pursued. Responses here compared well with information available from KNBS. These preliminaries were important for the study and the findings are discussed here below.

4.2.1 Legal Form and Sector Composition

As for legal form, all respondents were found to be companies registered under the company's act of Kenya. The manufacturing SMEs were drawn from fourteen sub-sectors in various proportions: Building, mining & construction, 1.46%; Chemical & allied, 10.22%; Energy, electrical & electronics, 3.65%; Food & beverage, 16.379%; Fresh produce, 0.73%; Leather & footwear, 1.46%; Metal and allied, 8.76%; Motor vehicle & accessories, 3.65%; Paper & board, 5.11%; Pharmaceutical & medical equipment, 5.11%; Plastics & rubber, 6.57%; Services & consultancy, 24.82%; Tex-

tile & apparel, 8.76%; Timber, wood &furniture, 2.92%. No further sub- sector-based analysis were pursued for it was not within the scope of this study.

One of the factors influencing SME financial decisions is the owner-manager characteristics such as gender, age, education and experience (Abdulsaleh & Worthington, 2013). It follows therefore that, these personal characteristics of the owner-manager make a difference to the firm's ability and likelihood of accessing different types of finance (Irwin & Scott, 2010; Cassar, 2004).

This is simply because the owner–manager in SME has the dominant position in the firm in their role as the primary decision maker. For example, Abdulsaleh and Worthington (2013), as well as Berggren, Olofsson and Silver (2000) argue that most owner–managers in SMEs do not prefer to finance firm operations using external finance, particularly as it entails changes in ownership structure whereby such financing may lead to control being shared with the lender. Similarly, literature has it that SME owner–managers themselves exert significant influence on their firms' financing decisions and subsequently performance and growth (Vos, Yeh, Carter, & Tagg, 2007; Coleman, 2007).

4.2.2 Gender of Respondents

The study sought to find out the distribution of gender across firms where data was sought. Gender may have some influence on efficiency of SMEs and it may be interesting to interrogate its interaction with efficiency. As indicated in Table 4.3, majority of the respondents were male at a majority 57 percent while the remainder were female, at 43 percent.

Table 4.3: Gender of Respondents

Gender	Frequency	Percent %	Cumulative percent %
Male	77	56.6	56.6
Female	59	43.4	100.0
Total	136	100.0	

From Table 4.3, it is apparent that men were the majority. Given that the SMEs are in the manufacturing sector, it is likely that many of the employees are men due to the perception that manufacturing require manual work. More men are therefore likely to seek employment in manufacturing firms than women would. Heads of finance for various companies are mainly accountants, probably because of the extensive financial training they undergo. The findings of this study concur with various literature, such as those of Migiro (2005).

Empirically, female and male entrepreneurs generally differ in the way they finance their businesses (Verheul & Thurik, 2001). This difference in financing sources related to gender among SMEs is more prominent during SME start-up stage. For example, Verheul and Thurik (2001) found that although men and women do not significantly differ regarding the type of capital, women SMEs owners appear to have a smaller amount of start-up capital and face more credibility issues when dealing with bankers (Badulescu, 2011).

Coleman (2007) also provided evidence of credit discrimination against female entrepreneurs as they were more frequently charged higher interest rates and asked to pledge additional collateral for loans to be granted. These can be said to be discrimination, abilities and preferences, and competition issues (Harrison & Mason, 2007). Still, these can be more attributed to differences related to business type, management style and experience.

4.2.3 Age Group of Respondents

This study targeted senior management employees of SMEs. The questionnaire required respondents to indicate their age bracket among three distinct classifications thus: 18-30 years, 31-50 years and above 50. This classification presumed no employment for minors. Majority (60%) of the respondents were in the 31-50 years' group. Those above 50 years were few at 33% while the young generation of 18 to 30 years formed only 7% of the respondents as shown in Figure 4.1.

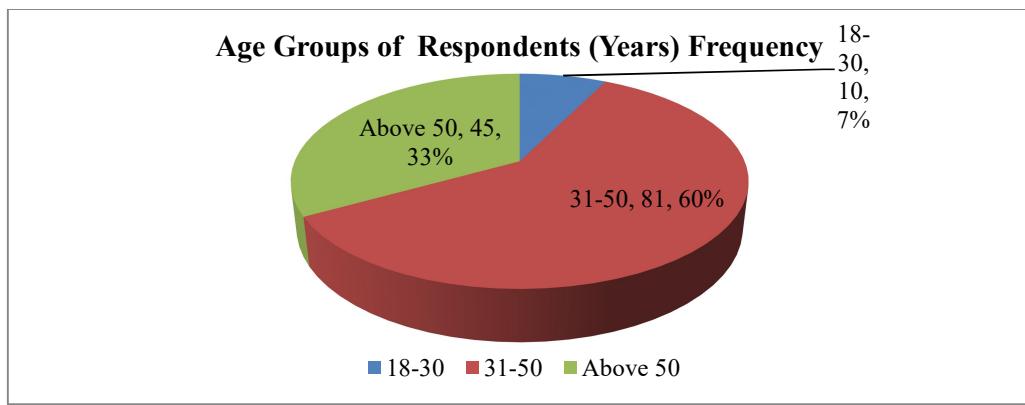


Figure 4. 1: Distribution of Age-groups of Respondents

The results show that majority of the respondents were aged between 31 and 50 years. Since this study was targeting management, it would be fair to conclude that majority of management are between 31 and 50 years.

Apparently, personal financing preferences of entrepreneurs change according to age. According to Abdulsaleh and Worthington (2013), Romano, Tanewski and Smyrnios (2001), the effect of the owner–manager's age on the financial behaviour of SMEs can be noted in that unlike older entrepreneurs' younger entrepreneurs are more likely to invest additional finance into their firms. This finding is in line with that of Van derwijst (1989) who suggests that older SME owner–mangers are more reluctant when it comes to accepting external ownership in the firm. Further, Vos et al. (2007) exam-

ined SME financial behaviour utilizing two data sets from the UK and the US consisting of 15 750 and 3 239 SMEs, respectively. The results show that younger owner–managers tend to use more bank overdrafts and loans, credit cards, own savings, and family sources than older owners who appear to be more dependent on retained profits.

Clarifying the connection between the financial growth cycle of SMEs and the owner–manager’s life cycle, Briozzo and Vigier (2009) assert that as the firm and its owner grow older, information asymmetries decrease, granting easier access to debt, while the owner’s risk aversion and personal costs of bankruptcy increase with age, and hence the desire to borrow less.

4.2.4 Role of Local Business Association – KAM

Local business associations unlike government agencies avoid legalistic but adopt advocacy approaches to solving firm problems, including access to credit. This research targeted members of Kenya Association of Manufacturers, an advocacy welfare organization, cognisant of its potential to spur AF growth. This organization promises its members a variety of products, among them those relating to ease of access to credit and their financial wellbeing of member firms, the fundamental interest of this study. This research therefore posed five questions of a five-point Likert-scale to be able to evaluate if in the opinion of the member firms, the credit access and financial proximity agenda were being pursued by the umbrella body, and thereby, gauge the level of success.

Respondents were to indicate the level to which their firms have benefited on particular services from being a member of KAM or a similar body. The hierarchy of benefits on a Likert scale of 1 to 5 ranged from ‘Not at all’ with a score of 1 to ‘tremendous-

ly' with a score of 5. Table 4.4 shows the results of the analysis of level of benefits on particular services from being a member of KAM.

On financial and managerial training, Figure 4.2, a great majority, 99 percent of all respondents indicated that they had benefited at least to some extent, few, 1% had not. While majority 84 percent felt that they had benefited at least "to a great extent", a few 16%, had not.

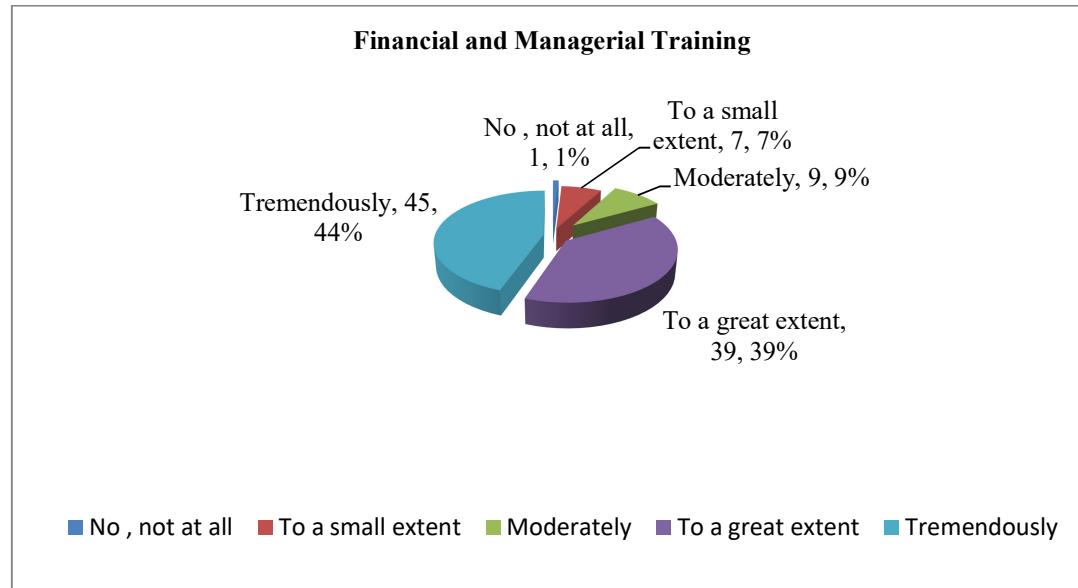


Figure 4. 2: Financial and Managerial Training

On policy formulation advocacy, a majority 99 percent of all respondents indicated that they had benefited at least to some extent, while a few, 1% did not. While a majority, 91 percent felt that they had benefited at least "to a great extent", a few, 9% did not.

On accessing market information, majority, 99 percent of all respondents indicated that they had benefited at least to some extent, while a few, 1% had not. While 88 percent felt that they had benefited at least "to a great extent", a few, 12% did not.

On product quality improvement, majority, 99 percent of all respondents indicated that they had benefited at least to some extent, while a few, 1% did not. While a great majority (91 percent) felt that they had benefited at least “to a great extent” only a few, 9% did not.

On accessing alternative financing loans, a majority 80 percent of all respondents indicated that they had benefited at least to some extent, while a few, 20% percent indicated that they accrued no benefit from their membership on their endeavours accessing alternative financing loans.

On expanding business net-works cumulative majority 99 percent of all respondents indicated that they had benefited at least to some extent, while a few 1% indicated that they had not benefited at all. While a majority 87 percent felt that they had benefited at least to a great extent, a few, 13%, had benefited to a small extent at most. While a few 47 percent were of the opinion that their level of benefit was tremendously high, 40% had benefited to a great extent, 8% moderately, 8% to a small extent and only 1% opined that they had not benefited at all.

Table 4.4 indicates responses for the whole benefits construct, covering six areas.

Table 4. 4: Benefits of Belonging to KAM

Benefits	No, not at all (%)	To a small extent (%)	Moderately (%)	To a great extent (%)	Tremendously (%)
Financial and managerial training	1	7	9	39	45
Policy formulation advocacy	1	4	4	46	45
Accessing market information	1	3	7	46	42
Product quality improvement	1	1	7	41	50
Accessing alternative financing loans	20	49	26	4	0
Expanding business net-works	1	4	8	40	47
Benefits of Belonging to KAM					

4.3 Analysis of Study Variables

Each of the study variables is now analysed in depth. Descriptive analysis incorporating both qualitative and quantitative aspects of the variables are pursued.

4.3.1 Efficiency Analysis

Operational efficiency is the attainment of an optimal input versus output ratio (Martić et al., 2009; Charnes et al., 1978). Efficiency is a relative measure (Hena, 2015). This research narrowed to the input-output dimension of efficiency. This involved applying the DEA model which measures relative efficiency with scores ranging between 0 and 1. The first objective of this study was to evaluate the operational efficiency of SMEs in the manufacturing sector in Kenya.

The study adopted multiple measures (two tools) approach for triangulation (to compensate any possible weaknesses of a single tool by the strengths of the other(s)). Questionnaire DQ1 and DQ2 were used. While DQ1 required opinion on an 11-point Likert scale, DQ2 pursued scale data (Banerjee, 2014 used increase/decrease criteria for profit and performance). This section discusses descriptive statistics for DEA application and calculation of overall operational efficiency.

Descriptive statistics provide a summary of the sample data, giving an indication as to how the SMEs are distributed along the variables. Some of the statistics discussed here are frequency distribution, mean, standard deviation, Skewness, kurtosis, minimum, and maximum, Similar statistics have been used in similar research works such as Mburiah (2017); Mburiah et al. (2016) and Mwangi (2014) in Kenya and others such as Aw et al. (2000); Coelli et al. (2005); Farinas and Martin-Marcos, (2002); Neely et al. (2001). The DEA model yields an objective evaluation of overall effi-

ciency and identifies the sources and estimates the amounts of identified inefficiencies. It may be applied for multiplicative models as well as log-linear envelopment.

4.3.1.1 DEA Inputs

For purposes of calculating efficiency, production costs, labour costs, operating expenses and finance costs were used as inputs. The inputs statistics as presented in Appendix 9 and 10 are discussed here below.

(a) Cost of Production

Appendix 10(a) represents a cost of production frequency distribution in million Shillings across the respondent. From Appendix 10(a) notice that majority (58.38%) of the SMEs have a production costs of 24 million shillings and below. Cumulatively, only 7.36% of the SMEs have cost of production of 48 million shillings and above.

From Appendix 9, observe some selected descriptive statistics. The SME with the highest cost of production spent 88.02 million shillings, 18 times more than the SME with the least cost of production, at 4.67 million shillings. From Appendix 9, the production costs are fairly distributed about the mean (24.71 million shillings) with a standard deviation of 15.51 million shillings and a slight positive moment coefficient of Skewness (tail towards the right-hand side of a cost of production distribution plot) of 1.23, the degree of asymmetry of the distribution around the mean (Alembummah, 2015). With a moment coefficient of Kurtosis, the degree of relative peakedness or flatness of a distribution curve compared with a normal distribution curve, of 1.64, indicative of a platykurtic (flatter) peak, well within the limits of 3 moments (Alembummah, 2015; Mburiah, 2017; Mburiah et al., 2016).

Product costing plays a vital role in the manufacturing environment, more so where standard costing method is applied in cost allocation. Production cost is one of the major costs classifications in a manufacturing environment. Production cost also

known as manufacturing cost incorporates three major types of costs, labour costs, material costs and overhead costs, even for SMEs. Due to disadvantages of small-scale productions, SMEs are likely to record higher average production costs, leading to lower efficiencies. However, this predicament was circumvented by the choice to use the DEA model.

(b) Staff Costs

Appendix 10(b) represents a frequency distribution of staff costs in million Shillings across the respondent SMEs. Notice that majority (56.62%) of the SMEs have a staff costs of 15 million shillings and below. Cumulatively, more than 33.82% of the SMEs have staff costs of at least 17.5 million shillings.

From Appendix 9, the SME with the highest staff costs incurs 25.4 million shillings, about 4 times more than the one with the least staff costs at 5.3 million shillings. The staff costs are fairly distributed about the mean (12.38 million shillings) with a standard deviation of 6.52 million shillings and a slight positive moment coefficient of Skewness with the tail towards the right-hand side of a staff cost distribution plot, of 0.37, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness or flatness of a distribution compared with the normal distribution, of -1.52, indicative of a platykurtic peak and well within the threshold of 3 absolutes.

(c) Operating Expenses

Appendix 10(c) represents a frequency distribution of operating expenses in million shillings across the respondent SMEs. Observe that a great majority (90.44%) of the SMEs have operating expenses below 18 million shillings. Cumulatively, only a few 3.58% percentage of firms incurred operating expenses above 30 million shillings individually.

Appendix 9 presents some selected descriptive statistics. The SME with the highest operating expenses incurred 45.38 million shillings, about 11 times more than the one with the least operating expenses, incurring 4 million shillings. The operating expenses are fairly distributed about the mean (11.36 million shillings) with a standard deviation of 7.81 million shillings and a positive moment coefficient of Skewness with the tail towards the right-hand side of an operating expenses distribution plot, of 2.01, the degree of asymmetry of the distribution around the mean. This distribution has a moment coefficient of Kurtosis or degree of relative peakedness of a distribution compared with the normal distribution of 5.59, indicative of a leptokurtic peak, well above the normal of 3 absolutes.

(d) Finance Costs

Appendix 10(d) represents a frequency distribution of finance costs in million Shillings across the respondent SMEs. The study found out that 52.94% of the SMEs have a finance costs below 1.5 million shillings. Cumulatively, only about 9.6% of the SMEs have finance costs of above 3.5 million shillings, 90.4% incurring finance costs below 3.5 million shillings.

From Appendix 9, the SME with the highest finance costs holds 4.2 million shillings, more than 6 times more than the one with the least finance costs, incurring 0.66 million shillings. The finance costs are fairly distributed about the mean of 1.88 million shillings) with a standard deviation of 1.02 million shillings and a slight positive moment coefficient of Skewness with tail towards the right-hand side of a finance cost distribution plot, of 0.45, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution of -1.31, indicative of a fairly platykurtic peak, well within 3 moments indicative of a normal curve.

4.3.1.2 DEA Outputs

On the other hand, this study used production, gross profit, return on investment and dividends as output. The outputs statistics as presented in Appendix 9 & 10 are discussed here below.

(a) Production

Production is taken as the total output in units of SME. Production is the total output of a firm which is subject to inputs used for production. The higher the production the higher the efficiency, given the input is held constant (Aw et al., 2000; Farinas & Martin-Marcos, 2002).

Appendix 10(e) represents a frequency distribution of production in million Shillings across the respondent SMEs. The study found out that 87.5% of the SMEs have a production of 100 million shillings and below. The SME with the highest production was 165.21 million shillings' worth of goods, about 8 times more than the one with the least production, with 19.14 million shillings' worth of goods. Cumulatively, only 12.5% of the SMEs have a production of over 100 million shillings while 87.5% had production of less than 100 million shillings.

From Appendix 9, production was fairly distributed about the mean of 64.39 million shillings with a standard deviation of 29.53 million shillings and a slight positive moment coefficient of Skewness with the tail towards the right-hand side of a production distribution plot, of 0.78, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 0.36, indicative of a platykurtic peak.

(b) Gross Profit Margin

Appendix 10(f) represents a Gross Profit Margin frequency distribution (in percentage %) across the respondent. From Appendix 10(f), the study found out that only a few (3.68%) percentage of the SMEs have a gross profit margin of 39.3(%) percentage points or less. Cumulatively, more than 15.44% of the SMEs have a gross profit margin of 44.5 percentage points and above.

Appendix 9 SMEs presents some selected descriptive statistics in percentage (%). The SME with the highest gross profit margin scored as high as 47.04 percentage points, while the one with the least gross profit margin, had 37.77 percentage points. The gross profit margin is fairly distributed about the mean of 42.32 percentage points, with a standard deviation of 1.86 percentage points and a slight positive moment coefficient of Skewness with the tail towards the right-hand side of a gross profit distribution plot, of 0.24, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of -0.42, indicative of a platykurtic peak, well within three moments limit of a normal curve.

(c) ROJ - Return on Investments

ROI or return on investment is defined as the efficiency of an investment. The higher the ROI, the higher the efficiency becomes (Coelli et al., 2005; Neely et al., 2001).

Equation 4.1 ROI

Appendix 10(g) represents a frequency distribution of ROI in percentage across the respondent SMEs. From Appendix 10(g), the study found out that a minority 40.44% of the SMEs have a ROI of between 10%, and 13%. Cumulatively, more than 54.01% of the SMEs have a ROI of at least 10%.

From Appendix 9, the SME with the highest ROI had 20.75%, and the one with the least ROI had -0.76%. The ROI is fairly distributed about the mean of 9.9 percentage points, with a standard deviation of 3.75 points and a slight negative moment coefficient of skewness with the tail towards the left-hand side of a ROI distribution plot of -0.20, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 0.94, indicative of a platykurtic peak. These findings triangulate well with performance ratings at 4.7.1 showing overall efficiency.

(d) Dividends

Dividends are a share of profits issued out to shareholders as per their shareholding. Dividends are the proportion of profits issued out to shareholders as a return on their investment. The higher the dividends the higher the efficiency of a firm is expected to be (Coelli et al., 2005; Neely et al., 2001). Appendix 10(h) represents a frequency distribution of dividends in million shillings across the respondent SMEs. From Appendix 10(h), the study found out that 35.29% of the SMEs have a dividend over 16%, up to 24% percentage points. The SME with the highest dividend achieved 63 percentage points and the one with least dividend, gave out nil percentage points, (a couple of SMEs gave no dividends at all). Cumulatively, more than 11% of the SMEs gave a high dividend of over 32 percentage points.

Notice from Appendix 9, the dividend pay-out is fairly distributed about the mean of 19.78 percentage points, with a standard deviation of 10.07 percentage points and a positive moment coefficient of Skewness with the tail towards the right-hand side of a dividend distribution plot, of 1.07, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis which is the degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 2.47,

indicative of a platykurtic peak. This degree of peakedness of 2.47 moments is well within the limits of 3 moments for a normal distribution.

4.3.2 Alternative Finance Analysis

The Appendix 9 shows the descriptive statistics for firm age, firm size and level of alternative finance. The firm's level of alternative finance is fairly distributed about the mean (141.56 million shillings) with a standard deviation of 101.75 million shillings and a positive moment coefficient of Skewness (tail towards the right-hand side of a distribution plot) of 0.95, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis (degree of relative peakedness or flatness of a distribution compared with the normal distribution) of 0.25, indicative of a platykurtic (flat) peak. The firm with the highest level of alternative finance has 526.52 million shillings while the one having the lowest holds 17.86 million shillings, as shown in Appendix 9.

Retained earnings and trade credit turned out to be the main alternative financing modes employed by SMEs members of KAM, mainly because of dividend policy as relates to retained earnings and usual business practice as relates to credit. However, peer to peer lending, peer to peer consumer lending and business angel financing were the least known and rarely used by the SMEs in Kenya.

4.3.3 Variables in Characteristics – Efficiency Relationship

The descriptive statistics provide a summary of the sample data, giving an indication as to how the SMEs are distributed along diverse variables. Three variables were hypothesized to interact level of alternative finance in an SME. These include Size, Age and Management competency. Responsive constructs in the questionnaire for each of the variables were: Size of SME – denoted by total assets, turnover; number of em-

ployees, age of SME denoted by number of years since incorporation; and management competency as indicated by education, experience and innovation. A discussion of responsive data statistics follows.

4.3.3.1 Firm Size Descriptive Analysis

Total assets forms part of the firm-size construct. From Appendix 9 SMEs assets as measured by log of total assets (SI Log) denoted by (T) is fairly distributed about the mean (8.03) with a standard deviation of 0.33 log and a slight positive moment coefficient of Skewness (tail towards the right-hand side of a normal distribution plot) of 0.014, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis (degree of relative peakedness or flatness of a distribution compared with the normal distribution) of -1.11, indicative of a platykurtic (flat) peak. The firm with the highest assets has 8.72 while the one having the lowest holds 7.34 (Appendix 9). Banerjee (2014) agrees that the survival of SMEs heavily depends on the availability of resources.

As indicated on Appendix 9, the SMEs turnover (O) is fairly distributed about the mean (64.39) with a standard deviation of 29.53 and a slight positive moment coefficient of Skewness (tail towards the right-hand side of a normal distribution plot) of 0.78, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis (degree of relative peakedness or flatness of a distribution compared with the normal distribution) of 0.36, indicative of a platykurtic (flat) peak (DeCarlo, 1997). The firm with the highest turnover has 165.21 while the one having the lowest had 19.14 (Appendix 9). Available literature by European Commission (2011); EIS (2005); KAM (2014); World Bank Group - IBRD and IDA (2017), all indicate turnover as a good and reliable measure of size of a firm.

Appendix 10(j) represents a frequency distribution of number of employees across the respondent SMEs. From Appendix 10(j), the study found out that cumulatively, a majority (99%) had up to 125 employees while only a few, 1%, had more than 125 employees. The number of employees is distributed about a mean of 54 with a standard deviation of 32 and a positive moment coefficient of Skewness with the tail towards the right-hand side of a number of employees' distribution plot, of 2, the degree of asymmetry of the distribution about the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 10, indicative of a Leptokurtic (very sharp) peak. The SME with the highest number of employees has 245 while the one with the least number of employees has seven (7) employees as shown in Appendix 10j.

4.3.3.2 Firm Age Descriptive Analysis

The firm age is fairly distributed about the mean (19.9 years) with a standard deviation of 18.6 years and a positive moment coefficient of Skewness with the tail towards the right-hand side of a firm age distribution plot, of 2.81, the degree of asymmetry of the distribution about the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 9.71, indicative of a Leptokurtic (very sharp) peak. The oldest firm is 119 years while the youngest is 2 years as shown in Appendix nine (9).

4.3.3.3 Managerial Competency Descriptive Analysis

Managerial competency composed of three constructs, experience, education and innovation. The managerial experience and education constructs composed of four subjects consisting of level of education of management, level of education of Board members, years of experience for managers and years of experience for board members. Since these two constructs had a universal response on a 5-point Likert scale, it

was possible to apply the law of averages on the four subjects to arrive at a single subject renamed education/experience. An either-or criterion for top management and board members was applied to ease the response threshold as shown in Appendix (9).

The level of education of management in an SME would hypothetically have a bearing on strategic decisions of the firm. This in turn would impact the efficiency of the firm. This research therefore required respondents to indicate the level of education of the top three managers of the firm and or any three board members. A 5 level Likert scale was used. The scales were: Up to primary school, a score of 1; up to high school, a score of 2; up to Diploma level, a score of 3; up to first degree, a score of 4; then master's degree and above, with a score of five (5).

The number of years of experience of a manager of an SME hypothetically impacts strategic decisions of a firm. This in turn would impact the efficiency of the firm. This research therefore required respondents to indicate the number of years of experience either in top management or as board member of the SME. A 5 level Likert scale was used. The scales were: Below 1 year - a score of 1; 1 year and less than 3 years - a score of 2; 3 years and less than 6 years - a score of 3; 6 years and less than 10 years - a score of 4; 10 years and above - with a score of five (5).

The distribution frequency for education and experience was averaged out into 5 classes with mid points 0.5- Very low education/experience, 1.5 – low education/experience, 2.5 – average education/experience, 3.5 – high education/experience and 4.5 – Very high education/experience. 136 SMEs were responsive as depicted in the distribution Appendix 9.

From the Appendix 10, notice that a few 2.9% of the top management of the SMEs have low education/experience, while 22.1% had average education/experience. Thir-

ty-nine -point seven per cent (39.7%) of the respondents had very high education/experience level, while a high majority of 75% had above average education/experience level.

From Appendix 9, data for education and experience was converted for compatibility. Education had a mean of 3.99, a standard deviation of 0.93, skewness of -0.15, kurtosis of -1.5, minimum of 2 and a maximum of 5. On the other hand, experience had a mean of 3.92, a standard deviation of 0.96, skewness of -0.04, kurtosis of -1.54, minimum of two (2) and a maximum of five (5).

On experience as measured by the number of years in an industry, Cole (1998) found that experience enhances the availability of credit. In fact, Nofsinger and Wang (2011) found that the experience of the entrepreneur is one factor that explains the difference in external financing levels available to SMEs. They further added that the cumulative experience of the owner–manager plays a crucial role in overcoming some of the problems that hinder SME access to external finance. On the other hand, since experienced entrepreneurs are believed to be better performers than less experienced entrepreneurs, it is then rational for lenders to factor experience into the process of evaluating the creditworthiness of SMEs (Abdulsaleh & Worthington, 2013; Gompers, Kovner, Lerner & Scharfstein, 2010).

Often employed by institutional financiers as a proxy for human capital, the educational background of the SME owner–manager is often positively related to the firm’s usage of leverage (Coleman, 2007). Abdulsaleh and Worthington (2013) states that a study by Bates (1990) examining the impact of owner–manager’s personal characteristics on SME longevity across a wide sample of SMEs owned–managed by men across the US between 1976 and 1986 concluded that owner–managers who had high-

er levels of education were more likely to retain their firms operating throughout the period of study.

He further emphasised that the level of education of entrepreneurs is a major determinant of banking loans amounts offered to SMEs (Abdulsaleh & Worthington, 2013). Storey (1994) asserts that entrepreneurs with higher levels of education exude more confidence in dealing with bankers and other funders when applying for loans.

SME manager/owner level of innovation was measured by average number of new branches opened and new products launched over the period 2012 to 2016. From the histogram Figure 4.3, the study observed a close to normal distribution of the number of new branches/products of the SMEs about the mean of 1.77 branches/products, with a standard deviation of 0.44 about the mean. A nil moment coefficient of Skewness of a new branches/products distribution plot, of 0.0, indicating perfect symmetry of the distribution about the mean.

With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 0.22, indicative of an almost normal peak (Figure 4.3). The SME with the highest number of new branches/products had 2.9 while the one with the least new branches/products had 0.4 new branches/products on average (Appendix 9).

Appendix 10(k) represents a frequency distribution of number of new branches/products across the respondent SMEs. From Appendix 10(k), the study found out that on average, all the SMEs had at least opened a new branch or launched a new product. While cumulatively, a majority (96%) had on average at least more than one branch/product, only a few (4%), had up to a maximum of one branch/product.

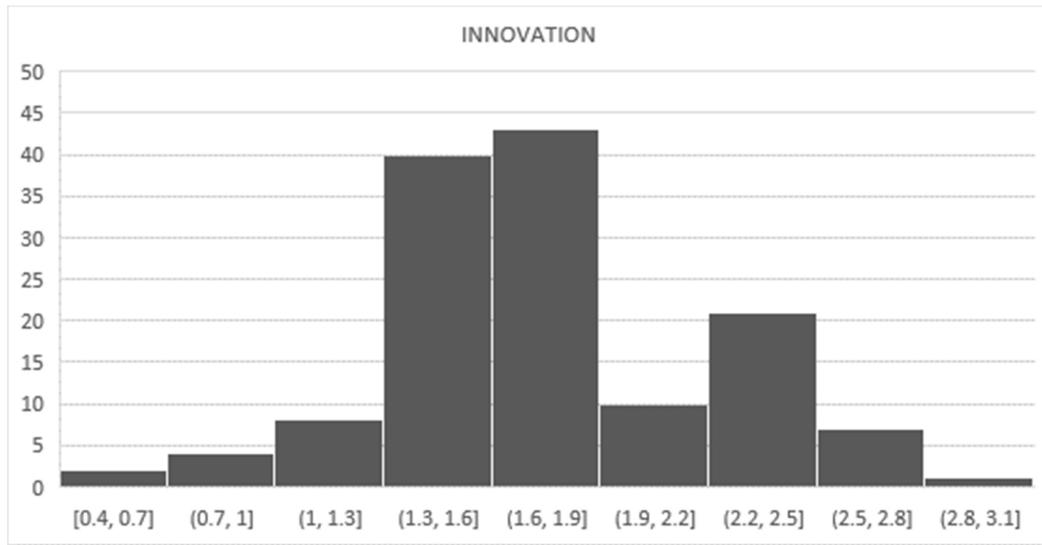


Figure 4. 3: Managerial Innovation

4.4 Test of Assumptions - Regression of Efficiency on Characteristics

Before data analysis, the study tested for the following assumptions to hold: Multicollinearity, heteroscedasticity, autocorrelation, linearity. Structural Linear Modelling - Partial Least Squares was also done to test robustness of linear programming.

4.4.1 Multicollinearity Test

Multicollinearity is a situation where two or more predictor variables in a multiple regression model are highly correlated (Brien, 2007; Martz, 2013). In this study the variance inflation factor (VIF) and the Tolerance were used to test for multicollinearity among the independent variables. Tolerance measures the impact of collinearity among the variables in a regression model and is calculated from $1 - R^2$ with a tolerance value close to 1 showing little multicollinearity, while a value close to 0 indicates presence of multicollinearity (Belsley, Kuh & Welsch, 2004).

The VIF gives an index that shows how much the variance of an estimated regression coefficient is increased because of collinearity (Wooldridge, 2000; 2013). According

to Brien, (2007); Cohen, Cohen, West and Aiken (2013); (2003), a VIF statistic above 5 is an indicator of multicollinearity and should be removed from regression models.

The Table 4.5 presents an SPSS multicollinearity test for Variance Inflation Factor (VIF) and Tolerance for the relationship between SME characteristics and efficiency multiple regressions. Three predictor variables (Firm age, Log of total assets and Managerial competency) were regressed against firm efficiency.

Table 4.5 presents the results of a Multicollinearity test for relationship between SMEs characteristics and efficiency variables. The results shown in Table 4.5 indicate VIF values of the three predictor variables range between a high of 1.145 and a low of 1.111, which are way below the threshold of 5. All tolerance values are close to 1, with the lowest being at 0.873. The study, therefore, found out that there is no evidence of multicollinearity in the data.

The Table 4.5 presents an SPSS multicollinearity test for Variance Inflation Factor (VIF) and Tolerance for the Multiple Regression of Managerial Competency on the Relationship between Characteristics and Efficiency. Three predictor variables (education, experience and innovation) were regressed against Alternative Finance (AF). Since tolerance ranges between .796 for education and .959 for innovation, there is no apparent risk of multicollinearity. Further, in view of the VIF measure, which range between 1.046 for innovation and 1.256 for education, the values are way below 5, the suggested cut-off score. VIF results support that the view that there is then no risk of multicollinearity, suggested by the tolerance measure.

4.4.2 Heteroscedasticity Test

Heteroscedasticity is a situation where the variability of a variable is unequal across the range of values of a second variable that predicts it (Breusch, & Pagan, 1979; Wil-

liams, 2015). In this study, heteroscedasticity was tested by performing the Breusch-Pagan / Cook-Weisberg test as shown in Table 4.5. The Breusch-Pagan / Cook-Weisberg tool tests the null hypothesis that the error variances are all equal (H_0) versus the alternative that the error variances are a multiplicative function of one or more variables (H_1) Williams (2015).

Homoscedasticity is evident when the value of “Prob > Chi-square” is greater than 0.05 (Park, 2008). Table 4.5 shows that the Lagrange Multiplier constant variance (Chi-square= .684) is not statistically significant ($P = 0.877$). Thus, the study failed to reject the null hypothesis and conclude that the error variance is equal thus, heteroscedasticity is not a problem in the data.

4.4.3 Autocorrelation Test

On Table 4.5 is an SPSS Durbin-Watson test of autocorrelation / serial correlation (Test for correlation of errors for different periods) output table. If the Durbin-Watson value is close to 2 on both sides (absolute), then autocorrelation is not a problem. From Table 4.5, the study noted a Durbin-Watson statistic of 1.9987, which is close to 2 (two). Hence autocorrelation is not a problem for the data analysing the relationship between characteristics and efficiency (Durbin & Watson, 1971).

4.4.4 Linearity Test Using Pearson Correlation Coefficient

The linear relationship of the independent variables on the dependent variables was tested using Pearson’s correlation coefficient between efficiency and each of the hypothesized variables as proposed by Yount (2006). The linearity results are shown on the findings presented in Table 4.5. Those findings indicate that there is significant positive linear relationship between and among all variables $P < 0.05$, except in the case of firm age and firm size where the relationship though significant is negative.

Interpretation Example: The output shows that the linear correlation coefficient (r,) between competency and efficiency is positive at 0.663. A significance factor of 0.000 is attributed to this absolute value of r meaning that the r value gotten is significantly different from zero at 0.05 level of confidence, for the given sample size n=136. Therefore, the test for linearity is proved.

The output shows that the linear correlation coefficient (r,) between size and efficiency is positive at 0.395. A significance factor of 0.000 is attributed to this absolute value of r meaning that the r value gotten is significantly different from zero at 0.01 level of confidence, for the given sample size n=136. Therefore, the test for linearity is proved.

Table 4. 5: Test of Assumptions Statistics

Test of Normality			
	Measure /Criteria	Results	Conclusion
Kurtosis	Moment coefficient; 3 Sigma, George and Mallery (2010), DeCarlo, (1997)	Min .22	Accept after removing outlier
Skewness	Moment coefficient; Rule of thumb: up to 0.5- Symmetric. Between 0.5 and 1- moderate skew; above 1- highly skewed.	Min, 0.00; Max 2.81.	Accept after removing outlier
Shapiro-Wilk Hypothesis	W-value; Reject null hypothesis if p>.05; Shapiro, & Wilk, (1965).	0.000	Accept

Test of Autocorrelation / Serial Correlation

Durbin-Watson		1.9987		Close to 2, Accept
	Pearson Correlation Coefficient	SMEs Characteristics and Efficiency		
	Efficiency	Efficiency	Firm Age	SI Log
Efficiency	Coefficient	1	.354**	.395**
	Sig. (2-tailed)	-	.000	.000
Firm Age	Coefficient	.354**	1	-.193*
	Sig. (2-tailed)	.000	-	.024
SI Log	Coefficient	.395**	-.193*	1
	Sig. (2-tailed)	.000	.024	-
Competency	Coefficient	.663**	.193*	.256**
	Sig. (2-tailed)	.000	.024	.003

**. Correlation significant at 0.01 level (2-tailed). *. Correlation significant at 0.05 level (2-tailed). N: 136

Test for Heteroscedasticity

Statistics	Breusch-Pagan / Cook-Weisberg		
	Df	Stat value	P-value
chi-squared	3	0.683974	0.876967

Collinearity Statistics

Model	Tolerance	VIF
Education	.796	1.256
Experience	.804	1.244
Innovation	.959	1.043
Firm Age	0.900	1.111
SI Log	0.873	1.145
Competency	0.874	1.145

a. Dependent Variable: Efficiency

The output shows that the linear correlation coefficient (r) between age and efficiency is positive at 0.354. A significance factor of 0.000 is attributed to this absolute value of r meaning that the r value gotten is significantly different from zero at 0.01 level of confidence, for the given sample size $n=136$. Therefore, the test for linearity is proved.

4.4.5 Structural Linear Modelling - Partial Least Squares

Structural linear modelling was used to test LP robustness and eliminate possibility of spurious correlations where data was either averaged or converted to fit a continuum. The item of interest therefore was significance at 95% confidence level while other

considerations were relaxed. Mburiah (2017) and Mburiah et al. (2016) used a similar approach where both linear programming and structural linear modelling were used.

4.5 Efficiency of SMEs – Overall Effect

Objective one was to evaluate the operational efficiency of SMEs in Kenya. This was accomplished by performing a DEA. The DEA input-output model as specified by Charnes et al. (1978) was utilized to calculate the efficiency of SMEs.

Model 3.1 (a) and 3.2 below.

$$E_I = \text{Maximize } \sum_{k=1}^m U_k Y_{ki} / \sum_{j=1}^n V_j X_{ji} \quad \dots \quad (3.1)$$

Subject to:

$$E_I = \text{Maximize } \sum_{k=1}^m U_k Y_{ki} / \sum_{j=1}^n V_j X_{ji} = < 1, \text{ for } i = 1, \dots, n \text{ and } V_j \geq 0 \dots (3.2)$$

Where: m = number of outputs for each SME using n different inputs; n = number of inputs used by each SME to produce m different outputs; y_{ki} = is the amount of the k^{th} output for the i^{th} SME; x_{ji} = is the amount of the j^{th} input used by the i^{th} SME; u_k = is the output weight; v_j = is the input weight

The results of the DEAP Version 2.1 run (Data Envelopment Analysis Program Version 2.1) are data points for each of the sampled SMEs having values ranging from 0.12 to 1. The output is further presented in Figure 4.4 and Table 4.6.

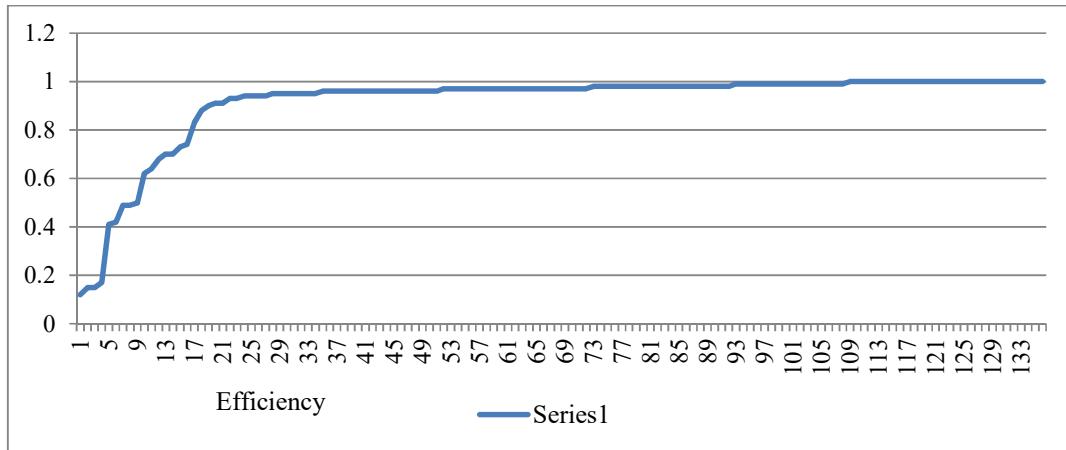


Figure 4.4: SMEs Efficiency Distribution Curve

From Figure 4.4, observe that the curve rises steeply in the beginning, such that within the first 20 or so MSE observations, the curve reaches efficiency levels of above 0.85. Hence only a few 2.2% of the SMEs have a relative efficiency of below 0.315, while most of the SMEs (86%) have a relative efficiency of over 0.89.

From Table 4.6, the SME with the lowest efficiency of 0.12 has an improvement gap of 0.88 points. The efficiency is fairly distributed about the mean of 0.92 efficiency level, with a standard deviation of 0.18 points and a negative moment coefficient of Skewness with the tail towards the left-hand side of an efficiency distribution plot, of -1.15, the degree of asymmetry of the distribution around the mean. With a moment coefficient of Kurtosis or degree of relative peakedness/flatness of a distribution compared with the normal distribution, of 1.72, indicative of a fairly platykurtic peak, well within the threshold of 3 moments of a normal curve.

Table 4.6: Efficiency Frequency Distribution

No.	Class (Points)	Frequency	Percentage
1	Up to 0.2	3	2.21
2	Over 0.2, Up to 0.315	0	-
3	Over 0.375, Up to 0.43	2	1.47
4	Over 0.43, Up to 0.545	3	2.21
5	Over 0.545, Up to 0.66	2	1.47
6	Over 66, Up to 0.775	6	4.41
7	Over 0.775, Up to 0.89	2	1.47
8	Over 0.89	118	86.76
N		136	100.00
		Minimum	0.12
		Std. Deviation	0.18
		Maximum	1
		Skewness	-1.15
		Mean	0.92
		Kurtosis	1.72

**n = 136; **Number of classes 8; SE=0.05

4.5.1 Triangulation of SME Efficiency Results

In the questionnaire, responses to question 1 in part D was designed to triangulate data provided in response to question 2 of the same part. Respondents were required, using the factors given, to indicate how their business had improved over the last 5 years on a scale of 0 to 10. The scales were “No improvement at all” with a score of 0; “Slight improvement with a score of 1; “Minor with a score of 2; “Moderate” with a score of 3; “Below average” with a score of 4; “Average Improvement” with a score of 5; “Above average” with a score of 6; “Cardinal” with a score of 7; “Major” with a score of 8; “High improvement” with a score of 9; and “Exceptionally high”, with a score of 10.

From the responses, this study found out an above-average score on the overall opinion on improvement of the factors of efficiency. From Table 4.7, it is noted that on improving of Gross profit, 99 percent of the respondents gave a score of six (6) and above, only 1percent gave a score of at most five (5). For improvement of Sales turn-

over, 99 per cent of the respondents gave a score of six (6) and above, 1 per cent of the respondents gave a score below five (5), while none of the respondents gave a score of 5. On returns on investment 100 per cent of the respondents gave a score of six (6) and above, 0 per cent of the respondents gave a score below five (5), and 0 per cent of the respondents gave a score of five (5). On improving dividends, 73 per cent of the respondents, 1 per cent of the respondents gave a score below five (5), while 26 per cent of the respondents gave a score of five (5). On improving retained earnings, 98 per cent of the respondents gave a score of six (6) and above, 2 per cent of the respondents gave a score below five (5), while 0 per cent of the respondents gave a score of five (5).

On improving total assets, 99 per cent of the respondents gave a score of six (6) and above, 1 per cent of the respondents gave a score below five (5), while 0 per cent of the respondents gave a score of five (5). On reduction of finance costs 99 per cent of the respondents gave a score of six (6) and above, 1 per cent of the respondents gave a score below five (5), while 0 per cent of the respondents gave a score of five (5).

On reduction in cost of sales, 99 per cent of the respondents gave a score of six (6) and above; 1 per cent of the respondents gave a score below five (5), while 0 per cent of the respondents gave a score of five (5). On reduction in labour costs 72 per cent of the respondents gave a score of six (6) and above, 2 per cent of the respondents gave a score below five (5), while 26 per cent of the respondents gave a score of five (5). On reduction of operating expenses, 35 per cent of the respondents gave a score of six (6) and above; 54 per cent of the respondents gave a score below five (5), while 11 per cent of the respondents gave a score of five (5). These findings on opinion on efficiency corroborate the calculated efficiency levels with a mean of 0.92 a standard deviation of 0.18 points across respondent SMEs.

Table 4.7: Efficiency Scores Over Five Years

Score Subject	0 %	1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %
Gross profit	0	0	0	1	0	0	0	21	24	28	26
Sales turnover	0	0	1	0	0	0	1	0	34	29	35
ROI	0	0	0	0	0	0	23	23	14	17	23
Dividends	1	0	0	0	0	26	23	28	22	0	0
Retained earnings	0	1	0	1	0	0	0	19	18	26	35
Total assets	0	0	1	0	0	0	0	24	23	19	33
Finance costs	1	0	0	0	0	0	21	26	20	17	15
Cost of sales	1	0	0	0	0	0	19	25	17	20	18
Labour costs	1	1	0	0	0	26	24	23	25	0	0
Operating expenses	1	0	20	15	18	11	15	20	0	0	0

Operational efficiency is interpreted as the attainment of an optimal input versus output ratio. The results of the DEAP (Data Envelopment Analysis Program) Version 2.1 run are data points for each of the sampled SMEs having values ranging from 0.12 to 1. Only 2.2% of the SMEs have a relative efficiency of below 0.315. Most of the SMEs (86% have a relative efficiency of over 0.89, The remaining 11.8% ranging above 0.315 and below 0.89. The SME with the lowest efficiency of 0.12 has an improvement gap of 0.88 points.

The efficiency is fairly distributed about the mean (0.92 efficiency level) with a standard deviation of 0.18 points and a negative moment coefficient of Skewness of -1.15, and a moment coefficient of Kurtosis of 1.72, indicative of a fairly platykurtic peak. Table 4.8 gives a comparative of efficiency findings of this study and those findings in Mwangi (2014). Notice that the mean efficiency for SME in the manufacturing sector is higher at 0.92 than that for SCCOS in Kenya at 0.775. However, the standard deviation for SME in the manufacturing sector is also higher at 0.18 than that for SCCOS in Kenya at 0.095.

Table 4.8: Efficiency Comparatives

Statistic	This study (2017)	Mwangi, (2014)
Arithmetic mean	0.92	0.775
Standard deviation	0.18	0.095
Coefficient of variation (ratio)		0.123
Lowest	0.12	0.557
Highest	1	1

4.6 Hypothesis Testing for Influence of Firm Size on Efficiency of SMEs in Kenya

For all hypothesis testing, this study employed Hierarchical Multiple Regression (HMR) model fitting strategy using Moderated Multiple Regression (MMR). MMR is a type of regression model that have moderator variables and their interactions with other predictor variables. In our case, (HMR model 1, 2 &3) were employed. The study adopted a hypothetical stance that alternative finance (AF) moderated the relationship between efficiency and firm characteristics in small and medium-size enterprises.

The dependent - independent variables relationship model used was outlined in 3.10 was adopted from Helm and Mark (2012). In interpreting the implications of moderation findings, this study considered both the statistically significant and statistically not-significant coefficients and consider their newfound relationship with the dependent variable.

Objective two was to determine whether firm size influences the efficiency of SMEs in the manufacturing sector in Kenya. This study achieved the objective by performing a regression of efficiency on firm size, followed by the three steps moderated mul-

tiple regression incorporating the three variables in the firm size construct (total assets, turnover and number of employees) to find out the moderating Influence of alternative finance on the relationship between firm size and Efficiency of SMEs. The null hypotheses were:

$H_{02,s}$: Firm size has no significant influence on efficiency of SMEs in Kenya,

$H_{02,s}$: Alternative finance has no significant moderating influence on the relationship between firm size and Efficiency of SMEs in Kenya.

Null hypotheses underlying the firm size construct are:

$H_{02,st}$: Alternative finance has no significant moderating influence on the relationship between total assets and Efficiency of SMEs in Kenya.

$H_{02,so}$: Alternative finance has no significant moderating influence on the relationship between turnover and Efficiency of SMEs in Kenya.

$H_{02,sy}$: Alternative finance has no significant moderating influence on the relationship between number of employees and Efficiency of SMEs in Kenya.

The study established initial model relationship between dependent and independent variables by use of model equation 3.3, then moderation relationship by use of models 3.4 and 3.5.

4.6.1 Model Summary for Testing Influence of Firm Size on Efficiency of SMEs in Kenya

Table 4.9 shows the four archetypes of the model summary for testing the influence of firm size on efficiency of SMEs in Kenya. The results of a regression of efficiency on firm size, those of the multiple regression of efficiency on firm size construct, and those of steps two and three of alternative finance moderated multiple regression of efficiency on firm size in archetypes 0S, 1S, 2S and 3S respectively.

Model 0S shows scores for regression run for efficiency on size for SMEs. After the strength and direction of R, the adjusted R^2 is also a vital aspect in the model summary. The study observed a positive correlation coefficient R of 0.395, R-square at 0.156 and adjusted R-square at 0.156. Therefore, an adjusted model can explain about 15.0% of the variations in level of efficiency in SMEs. From model 1S for initial moderation step, observe a positive correlation coefficient R of 0.454. As the predictor (firm size) increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 18.8% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R^2 value of .188.

From model 2S for step 2 of moderation, observe a positive correlation coefficient R of 0.549. As the predictor variable increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 28.0% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R^2 value of .280. From archetypal 3S, representing alternative finance moderated multiple regression of efficiency on size, the study observed a positive correlation coefficient R of 0.563.

Therefore, as the predictor variable increases, an increase in the response variable, efficiency, should be observed. An adjusted model can explain about 28.6% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R^2 value of .286.

Table 4. 9: Model Summary for Regression of Efficiency on Firm Size, and for Alternative Finance Moderated Multiple Regression of Efficiency on Firm Size

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
0(S) ^a	.395	.156	.150	.16379
1(S) ^b	.454	.206	.188	.16006
2(S) ^c	.549	.302	.280	.15072
3(S) ^d	.563	.317	.286	.15015

- a. Dependent: Efficiency. Predictors: (Constant); Firm Size.
- b. Dependent: Efficiency. Predictors: (Constant), No of Employees; Assets; Turnover.
- c. Dependent: Efficiency. Predictors: (Constant), No of Employees; Assets; Turnover. Moderator – Alternative Finance.
- d. Dependent: Efficiency. Predictors: (Constant); No of Employees; Assets; Turnover. Moderator interactions - AF × No of Employees; AF × Assets; AF × Turnover. Moderator – Alternative Finance.

4.6.2 Analysis of Variance (ANOVA) Table for Regression of Efficiency on Firm Size

Table 4.10 illustrates the four archetypes of the Two-way analysis of variance (ANOVA) for testing the influence of firm size on efficiency of SMEs in Kenya. The ANOVA results of a regression of efficiency on firm size, those of the multiple regression of efficiency on firm size construct, and ANOVA of steps two and three of alternative finance moderated multiple regression of efficiency on firm size in archetypes 0S, 1S, 2S and 3S respectively.

Two-way analysis of variance (ANOVA) isolates systematic data variability separate from random variability in data sets. It establishes the type of relationships between and among multiple data sets by use of the systematic variability. The imperative in an ANOVA table is the significance of the F Statistic. From the ANOVA Table 4.10, model 0S, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). The study found out that the F-

test statistic (24.83) is highly significant, since P-value <0.05. The study therefore, rejected H_0 and accept the alternative that the model explains the variance in the dependent variable to a significant level.

In ANOVA Table 4.10, model 1S, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (11.444) is highly significant, where P-value <0.05. The study rejected the null hypothesis and therefore, concluded that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

In ANOVA Table 4.10, archetypal 2S, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$).

Since observed F-test statistic (14.145) is highly significant, where P-value <0.05. the study rejected the null hypothesis and therefore, conclude that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

In ANOVA Table 4.10, archetypal 3S, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (9.686) is highly significant, where P-value <0.05. The null hypothesis is rejected and the study therefore, concluded that the model has moderating power, since it explains to a significant level, the variations in efficiency level of an SME.

4.6.3 Coefficients for Testing Influence of Firm Size on Efficiency

Table 4.10 presents four archetypes of coefficients for testing the influence of firm size on efficiency of SMEs in Kenya. The results of regression of efficiency on firm size, multiple regression of efficiency on firm size construct, and of steps two and three of the alternative finance moderated multiple regression of efficiency on firm size in archetypes 0S, 1S, 2S and 3S respectively.

The coefficients Table 4.10 archetypal 1S is the results of a regression run of efficiency on size of SMEs. Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.10, model 1S, observe that for the predictor variable, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Firm size regression coefficient was positive and significant as well ($\beta = 0.214$, t-value =4.983, $P<0.05$). Therefore, then the null hypothesis of no relationship is rejected, accepting the alternative $H_{12, s}$. Hence there is a positive relationship between the predictor variables size and the dependent variable, efficiency.

Coefficients Table 4.10 model 2S presents MMR of AF on firm Size - efficiency relationship of SMEs in a hierarchical multiple regression process (step1). Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients model 2S, observe that for one of the three predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Total assets regression coefficient was positive and significant with ($\beta = 0.419$, t-value =5.401, $P<0.05$). Turnover regression coefficient was positive but statistically not significant with ($\beta = 0.036$, t-value =.243, $P>0.05$); Number of employee's coefficient was positive but statistically not significant as well with

($\beta = 0.145$, t-value = .989, $P > 0.05$). Therefore, then the null hypothesis of no relationship is rejected for total assets, accepting the alternative $H_{12, ST}$.

Consequently, the study found out that a positive relationship between the total assets and the dependent variable (efficiency) does exist. For turnover and number of employees, accept the null hypotheses ($H_{02, SO}$ & $H_{02, SY}$) and conclude that there is no significant relationship between the turnover and the dependent variable and, that there is no significant relationship between number of employees and the dependent variable (efficiency).

Since there are significant variables in step 1 above, the study escalates to step 2 and introduce the moderator into the equation. The study used equation 3.4 as adopted.

Table 4.10 archetypal 2S presents step 2 coefficients for alternative finance moderated multiple regression of efficiency on size. archetypal 2S presents coefficients of MMR of AF on firm size - efficiency relationship of SMEs in a hierarchical multiple regression process (step 2). Of importance here is the significance of the t-values, the p-values and the coefficients. From the coefficients Table 4.10, it is observed that for the moderator and one of the three predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Total assets regression coefficient was positive and significant with ($\beta = 1.326$, t-value = 5.848, $P < 0.05$); Alternative finance regression coefficient was negative and significant with ($\beta = -.959$, t-value = -4.226, $P < 0.05$).

Turnover regression coefficient was positive but statistically not significant with ($\beta = 0.043$, t-value = .312, $P > 0.05$); Number of employee's coefficient was positive but statistically not significant with ($\beta = 0.122$, t-value = .882, $P > 0.05$). Therefore, then the null hypothesis of no relationship is rejected for total assets, accepting the alternative

H_{12} , ST. Consequently, the study concluded that a positive moderating influence impacts relationship between the total assets and the dependent variable efficiency.

For turnover and number of employees, the study accepted the null hypothesis H_{02} , so & H_{02} , SY and conclude that there is no significant relationship between the turnover and the dependent variable and, that there is no significant relationship between number of employees and the dependent variable (efficiency). Since there are some significant variables from step two, we escalate to step three and now include the moderator as a factor on all variables using the model 3.5 as adopted.

Table 4.10 model 3S presents coefficients for alternative finance moderated multiple regression of efficiency on size. For coefficients model 3S, observe that for one of the three predictor variables one of the three moderated variables, and the moderator, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Total assets (SI) regression coefficient was positive and significant as well ($\beta = 0.696$, t-value = 5.811, $P < 0.05$); Total assets x Alternative finance regression coefficient was negative, and significant (β standardized = -0.690, t-value = 2.676, $P < 0.05$); turnover regression coefficient was positive but statistically not significant ($\beta = 0.001$, t-value = 1.653, $P > 0.05$).

Number of employees regression coefficient was positive but statistically not significant ($\beta = 0.001$, t-value = .698, $P > 0.05$); Alternative Finance x Number of employees regression coefficient was negative and statistically not significant ($\beta = -3.581E-006$, t-value = -.620, $P > 0.05$; Turnover x Alternative finance regression coefficient was positive but statistically not significant ($\beta = -4.243E-006$, t-value = -.857, $P > 0.05$).

Therefore, then for total assets, the null hypothesis of no relationship is rejected, accepting the alternative H_{12} , ST. Consequently, the study concludes that AF does mod-

erate firm size relationship with efficiency. Further, for turnover and number of employees, the study accepted the null hypothesis that alternative finance has no moderating impact on the relationship between turnover, number of employees and efficiency.

Substituting the coefficients into our initial moderated multiple linear regression model, the study obtained a linear equation:

$$Ei = -4.563 + 0.696S_i + 0.001Y_i - 0.001AF_i + 0.001O_i + 03.581E - 006(Y_iF_i) - 000(S_iF_i) - 4.243E - 006(O_iF_i) + \varepsilon_{22}$$

..... 3.5

Where:

E Efficiency

S_i Size (Total assets)

O Turnover

AF Alternative finance

Y Number of employees

ε_{22} Error term

The predictive power of the model improves by 9.6 % form the initial adjusted R² of 18.8 percent to a new high of 28.6%. Introducing AF to impact total assets, turnover and number of employees would significantly impact efficiency positively.

Table 4. 10: Analysis of Variance and t-test Coefficients for Regression of Efficiency on Firm Size, and of Alternative Finance Moderated Multiple Regression of Efficiency on Firm Size

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
0(S)	Regression	.666	1	.666	24.830	.000 ^b
	Residual	3.595	134	.027		
	Total	4.261	135			
1(S)	Regression	.880	3	.293	11.444	.000 ^b
	Residual	3.382	132	.026		
	Total	4.261	135			
2(S)	Regression	1.285	4	.321	14.145	.000 ^b
	Residual	2.976	131	.023		
	Total	4.261	135			
3(S)	Regression	1.323	6	.221	9.686	.000 ^b
	Residual	2.938	129	.023		
	Total	4.261	135			

t-test coefficients						
Model	Variable	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
0S	(Constant)	-.806	.346		-2.331	.021
	Size	.214	.043	.395	4.983	.000
1S	(Constant)	-.971	.339		-2.863	.005
	Assets	.227	.042	.419	5.401	.000
	Turnover	.000	.001	.036	.243	.809
	No of Employees	.001	.001	.145	.989	.324
2S	(Constant)	-4.680	.934		-5.011	.000
	SI Log	.719	.123	1.326	5.848	.000
	Turnover	.000	.001	.043	.312	.756
	No of Employees	.001	.001	.122	.882	.379
	AF	-.002	.000	-.959	-4.226	.000
3S	(Constant)	-4.563	.914		-4.990	.000
	AF x Employees	-3.581E-006	.000	-.130	-.620	.536
	No of Employees	.001	.001	.107	.698	.487
	SI Log	.696	.120	1.284	5.811	.000
	AF x Turnover	-4.243E-006	.000	-.202	-.857	.393
	Turnover	.001	.001	.246	1.653	.101
	AF x SI Log	.000	.000	-.690	-2.676	.008
	AF	-.001	.001	-.695	-2.289	.024

- a) Dependent Variable: Efficiency; Predictors: (Constant), Firm Size
- b) Dependent Variable: Efficiency; Predictors: (Constant), No of Employees, SI Log, Turnover
- c) Dependent Variable: Efficiency. Predictors: (Constant), AF, Turnover, No of Employees, Assets.
- d) Dependent Variable: Efficiency. Predictors: (Constant), AF x SI Log, Turnover, No of Employees, AF x Employees, SI Log, AF x Turnover, AF.

From Table 4.11, notice that the overall predictive power (R-Square) of the model improves by 9.8 % form the initial adjusted R² of 18.8 percent to a new high of 28.6%. Introducing AF to moderate total assets, turnover and number of employees will significantly impact efficiency positively, since Sig P<0.05 for SI at all steps and incremental deviation is consistently positive.

This implies that alternative finance has significant moderating influence on size-efficiency relationship of SMEs. The increases in the equation predictive power of total assets, turnover and number of employees by 9.8%. is consistent stepwise, increase is 18.8% in step one, 9.2% in step 2 and 0.6% in step three.

Table 4. 11: Summary of Adjusted R-Square Predictive Power -Firm Size

Moderated Regression Step	Adjusted Square	R- Change	Sig P<0.05	SI	Turnover	Employees
1	18.8	18.8	Yes	No	No	No
2	28.0	09.2	Yes	No	No	No
3	28.6	0.6	Yes	No	No	No

4.7 Hypothesis Testing of The Influence of Firm Age on Efficiency of SMEs in Kenya

Objective three was to establish whether firm age influences firm efficiency in SMEs in manufacturing sector in Kenya. This was accomplished by performing a regression of efficiency on firm age, then performing the three steps process of moderated multiple regression to find out the moderating influence of alternative finance on the relationship between firm age and efficiency of SMEs. The null hypotheses were:

$H_{03,G}$: SME age has no significant influence on efficiency of SMEs in manufacturing sector in Kenya,

$H_{03,G}$: Alternative finance has no significant moderating influence on the relationship between SME age and efficiency in manufacturing sector in Kenya.

The study established initial model relationship between dependent and independent variables by use of model equation 3.6, then moderation relationship by use of models 3.7 and 3.8.

4.7.1 Model Summary for Influence of Firm Age on Efficiency of SMEs in Kenya

Table 4.12 shows the four archetypes of the model summary for testing the influence of firm age on efficiency of SMEs in Kenya. The results of a regression of efficiency on firm age, those of the multiple regression of efficiency on firm age construct, and also those of steps two and three of alternative finance moderated multiple regression of efficiency on firm age in archetypes 0G, 1G, 2G and 3G respectively.

A model summary of a regression run for efficiency on age for SMEs is presented in Table 4.12. After the strength and direction of R, the adjusted R^2 is also a vital output in the model summary Table. From the summary of the model in Table 4.12, the study observed a positive correlation coefficient R of 0.354 and R^2 at 0.125. An adjusted model can explain about 11.9% of the variations in level efficiency in SMEs, given adjusted $R^2=0.119$.

From model summary Table 4.12, observe a positive correlation coefficient R of 0.354. As the predictor (firm age) increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 11.9% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R^2 value of .119. From model summary Table 4.12, it is observed that a positive correlation coefficient R of 0.488 results. As the predictor (firm age) increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 22.6%

of the variations in level efficiency in SMEs as demonstrated by the adjusted R² value of 0.226.

From model summary Table 4.12, the study observes a positive correlation coefficient R of 0.489. As the predictor (firm age) increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 22.2% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R² value of 0.222.

Table 4. 12: Model Summary for Regression of Efficiency on Firm Age and for Alternative Finance Moderated Multiple Regression of Efficiency on Firm Age

Model	Model Summary			Std. Error of the Estimate
	R	R Square	Adjusted R Square	
0(G) ^a	.354	.125	.119	.16678
1(G) ^b	.354	.125	.119	.16678
2(G) ^c	.488	.238	.226	.15628
3(G) ^d	.489	.239	.222	.15673

a. Predictors: (Constant), Firm Age

b. Predictors: (Constant), Firm Age

c. Predictors: (Constant), Firm Age. Moderator – Alternative Finance (AF),

d. Predictors: (Constant), Firm Age, Moderator – Alternative Finance (AF). Interaction variables: AF × firm age.

4.7.2 Analysis of Variance (ANOVA) for Influence of Firm Age on Efficiency of SMEs in Kenya

Table 4.13 illustrates the four archetypes of the Two-way analysis of variance (ANOVA) for testing the influence of firm age on efficiency of SMEs in Kenya. The ANOVA results of a regression of efficiency on firm age, those of the multiple regression of efficiency on firm age construct, and also ANOVA of steps two and three of alternative finance moderated multiple regression of efficiency on firm age in archetypes 0G, 1G, 2G and 3G respectively.

Table 4.13, archetypes 0G, is an ANOVA of a regression run of efficiency on age. Two-way analysis of variance (ANOVA) isolates systematic data variability separate from random variability in data sets. It establishes the type of relationships between

and among multiple data sets by use of the systematic variability. The imperative in an ANOVA table is the significance of the F Statistic. From the ANOVA Table 4.13, archetypal 0G, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$).

The study found out that the F-test statistic (19.193) is highly significant, since P-value <0.05. The study therefore, rejected H_0 and accepted the alternative that the model explains the variance in the dependent variable to a significant level.

In ANOVA Table 4.13, archetypal 1G, for multiple regression of efficiency on firm age, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (19.193) is highly significant, where P-value <0.05. The study rejected the null hypothesis and therefore, concluded that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

In ANOVA Table 4.13, archetypal 2G, for alternative finance moderated multiple regression of efficiency on firm age, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (20.732) is highly significant, where P-value <0.05. The study therefore, rejected the null hypothesis and hence concluded that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

In ANOVA Table 4.13, archetypal 3G, for alternative finance moderated multiple regression of efficiency on firm age, step 3 the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (13.825) is highly significant, where P-value

<0.05. The study rejects the null hypothesis and concluded that the model has moderating power, since it explains to a significant level, the variations in efficiency level of an SME.

4.7.3 Coefficients Table for Influence of Firm Age on Efficiency of SMEs in Kenya

Table 4.13 presents four archetypes of coefficients for testing the influence of firm age on efficiency of SMEs in Kenya. The results of regression of efficiency on firm age, multiple regression of efficiency on firm age and for steps two and three of alternative finance moderated multiple regression of efficiency on firm age in archetypes 0G, 1G, 2G and 3G respectively.

Table 4.13, archetypes 0G are coefficients of a regression run of efficiency on firm age of SMEs. Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.13, observe that for the predictor variable, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Firm age regression coefficient was positive and significant as well ($\beta = 0.003$, t-value = 4.381, $P < 0.05$); Therefore, then the null hypothesis of no relationship is rejected, accepting the alternative $H_{13,G}$. Consequently, the study concluded that a positive relationship between the predictor variables and the dependent variable does exist.

Coefficients Table 4.13 archetypal 2G presents multiple regression of efficiency on firm age for SMEs in a hierarchical multiple regression process (step1). Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.13 archetypal 2G, the study observed that for the predictor variable, the t-values are significant, since P-value observed < 0.05

the tabulated critical P-value. Specifically: Firm age regression coefficient is positive and significant with ($\beta = 0.354$, t-value = 4.381 , $P<0.05$).

Therefore, then the null hypothesis of no relationship is rejected accepting the alternative $H_{13, G}$. Consequently, the study concluded that a positive relationship between firm age and the dependent variable (efficiency) does exist. Since there are significant variables in step 1 above, we escalate to step 2 and introduce the moderator into the equation. The study used equation 3.7 as adopted.

Coefficients Table 4.13 archetypal 2M presents coefficients for alternative finance moderated multiple regression of efficiency on firm for SMEs in a hierarchical multiple regression process (step 2). Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.13, it is apparent that for all the variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Firm age regression coefficient was positive and significant with ($\beta = 0.403$, t-value = 5.272 , $P<0.05$); Alternative finance regression coefficient was positive and significant with ($\beta = .339$, t-value = -4.428 , $P<0.05$).

Therefore, then the null hypothesis of no relationship is rejected, accepting the alternative $H_{13, G}$. Consequently, the study concluded that a positive moderating influence impacting relationship between firm age and the dependent variable - efficiency does exist.

Since there are some significant variables from step two, the study then loads the moderator on all significant variables using the model equation 3.8 as adopted.

For Table 4.13, archetypal 3M, notice coefficients table for alternative finance moderated multiple regression of efficiency on firm age. From the coefficients Table 4.13, it

is observed that for the predictor variable and the moderator, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value.

Specifically: firm age regression coefficient was positive and significant as well ($\beta = .003$, t-value = 3.271, $P < 0.05$); alternative finance regression coefficient was positive and significant ($\beta = .069$, t-value = 3.112, $P < 0.05$); firm age x Alternative Finance regression coefficient was negative but statistically not significant ($\beta = -0.001$, t-value = -0.496, $P > 0.05$). Therefore, then for firm age, the null hypothesis of no relationship is, accepted. Consequently, the study concludes that AF does not moderate firm age relationships with efficiency.

Table 4. 13: Analysis of Variance and t-test Coefficients for Regression of Efficiency on Firm Age, and on Alternative Finance Moderated Multiple Regression of Efficiency on Firm Age.

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
0(G)	Regression	.534	1	.534	19.193	.000 ^b
	Residual	3.727	134	.028		
	Total	4.261	135			
1(G)	Regression	.534	1	.534	19.193	.000 ^b
	Residual	3.727	134	.028		
	Total	4.261	135			
2(G)	Regression	1.013	2	.506	20.732	.000 ^b
	Residual	3.248	133	.024		
	Total	4.261	135			
3(G)	Regression	1.019	3	.340	13.825	.000 ^b
	Residual	3.242	132	.025		
	Total	4.261	135			

t-test Coefficients						
Archetypal	Variable	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
(0G) ^a	(Constant)	.851	.020		41.565	.000
	Firm Age	.003	.001	.354	4.381	.000
(1G) ^b	(Constant)	.851	.020		41.565	.000
	Firm Age	.003	.001	.354	4.381	.000
(2G) ^c	(Constant)	.842	.019		43.646	.000
	Firm Age	.004	.001	.403	5.272	.000
	AF	.060	.014	.339	4.428	.000
(3G) ^d	(Constant)	.848	.023		37.442	.000
	Firm Age	.003	.001	.364	3.271	.001
	AF	.069	.022	.388	3.112	.002
	AF x Firm Age	-.001	.001	-.077	-.496	.620

a) Dependent Variable: Efficiency; Predictor: Firm Age

b) Dependent Variable: Efficiency; Predictors: Firm Age

c) Dependent Variable: Efficiency. Predictors: Firm Age. Moderator: Alternative finance.

d) Dependent Variable: Efficiency. Predictors: Firm Age. Moderator: Alternative finance. Moderator Interaction: Alternative finance × Firm Age.

Substituting the coefficients into our initial moderated multiple linear regression model, the resultant linear equation obtained is:

$$Ei = 0.848 + +0.003G_i + 0.069AF_i - .001(G_iAF_i) + \varepsilon_{22} \dots \quad 3.8$$

Where:

Ei : Efficiency

G_i : Firm age

AF_i : Alternative finance

ε_{22} Error term

The predictive power of the model improves by 10.3 % from the initial adjusted R² of 11.9 percent to 22.2%. Older SMEs would therefore benefit more from AF. However, this benefit is not statistically significant.

From Table 4.14, notice that the overall predictive power (R-Square) of the model improves by 10.3 % form the initial adjusted R² of 11.9 percent to a new high of 22.2%. Introducing AF to moderate age will not significantly impact efficiency positively, since Sig P>0.05 at step 3 and incremental deviation is negative. This implies that alternative finance has no significant moderating influence on the relationship between SMEs' age and their efficiency. The increases in the equation predictive power of age of firm by 10.3%. is not consistent stepwise, where increase is 11.9% in step one, 10.7% in step 2 and -0.4% in step three.

Table 4. 14: Summary of R-Square Predictive Power – Age

Moderated Regression Steps	Adjusted R-Square	Change	Sig P<0.05 of Age
1	11.9	11.9	Yes
2	22.6	10.7	Yes
3	22.2	-0.4	No

4.8 Hypothesis Testing of the Influence of Managerial Competency on Efficiency of SMEs in Kenya

Objective four was to find out how managerial competency influences efficiency of SMEs in the manufacturing sector in Kenya. This was accomplished by performing a regression of efficiency on managerial competency, followed by the three steps process to find out the moderating influence of alternative finance on the relationship be-

tween managerial competency and efficiency of SMEs in the manufacturing sector in Kenya. The null hypotheses were:

$H_{04,M}$: Managerial competency has no significant influence on efficiency of SMEs in the manufacturing sector in Kenya,

$H_{04,M}$: Alternative finance has no significant moderating influence on the relationship between manager experience and efficiency of SMEs in the manufacturing sector in Kenya.

Null hypotheses underlying the managerial competency construct are:

$H_{04,MX}$: Alternative finance has no significant moderating influence on the relationship between manager experience and efficiency of SMEs in the manufacturing sector in Kenya.

$H_{04,MU}$: Alternative finance has no significant moderating influence on the relationship between manager level of education and efficiency of SMEs in Kenya.

$H_{04,MI}$: Alternative finance has no significant moderating influence on the relationship between manager innovativeness and efficiency of SMEs in Kenya.

The study established initial model relationship between dependent and independent variables by use of model equation 3.9, then moderation relationship by use of models 3.10 and 3.11.

4.8.1 Model Summary for Influence of Managerial Competency on Efficiency of SMEs in Kenya

Table 4.15 shows the four archetypes of the model summary for testing the influence of managerial competency on efficiency of SMEs in Kenya. The results of a regression of efficiency on managerial competency, those of the multiple regression of efficiency on managerial competency construct, and also those of steps two and three of

alternative finance moderated multiple regression of efficiency on managerial competency in archetypes 0M, 1M, 2M and 3M respectively.

Table 4.15, archetypal 0M, presents a regression run for efficiency on managerial competency for SMEs. After the strength and direction of R, the adjusted R^2 is vital in the model summary. From the summary of the model in Table 4.15, archetypal 0M, the study observed a strong positive correlation coefficient R of 0.663 and R^2 at 0.439. An adjusted model can therefore explain about 43.5% of the variations in level of efficiency in SMEs, given that adjusted $R^2 = .435$.

From model summary Table 4.15, archetypal 1M for multiple regression of efficiency on managerial competency, a positive correlation coefficient R of 0.541 is observed. As the predictor variable (managerial competency) increases, an increase in the dependent variable (efficiency) should be observed. An adjusted model can explain about 27.6% of the variations in level efficiency in SMEs as demonstrated by the adjusted R^2 value of .276.

From model summary Table 4.15, archetypal 2M, for alternative finance moderated multiple regression of efficiency on managerial competency a positive correlation coefficient R of 0.571 is observed. Thus, as the predictor variable increases, an increase in the dependent variable (efficiency) should be observed. An adjusted regression model can explain about 30.6% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R^2 value of .306.

From model summary Table 4.15, archetypal 3M, step 3 of the MMR, the study observes a positive correlation coefficient R of 0.509. Therefore, as the predictor variable (managerial competency) increases, an increase in the dependent variable (effi-

ciency) should be observed. An adjusted model can explain about 48.2% of the variations in level of efficiency in SMEs as demonstrated by the adjusted R² value of .482.

Table 4. 15 Model Summary for Regression of Efficiency on Managerial Competency, and for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
0(M) ^a	.663	.439	.435	.13353
1(M) ^b	.541	.292	.276	.15163
2(M) ^c	.571	.327	.306	.14850
3(M) ^d	.713	.509	.482	.12828

- a) Dependent Variable: Efficiency; Predictor: Managerial Competency
- b) Dependent Variable: Efficiency; Predictors: Innovation, Education, Experience
- c) Dependent Variable: Efficiency. Predictors: Innovation, Education, Experience. Moderator - Alternative Finance.
- d) Dependent Variable: Efficiency. Predictors: Innovation, Education, Experience. Moderator - Alternative Finance. Interaction Variables: AF x Innovation, AF x Education, AF x Experience.

4.8.2 Analysis of Variance (ANOVA) for Influence of Managerial Competency on Efficiency of SMEs in Kenya

Table 4.16 illustrates the four archetypes of the Two-way analysis of variance (ANOVA) for testing the influence of managerial competency on efficiency of SMEs in Kenya. The ANOVA results of a regression of efficiency on managerial competency, those of the multiple regression of efficiency on managerial competency construct, and also ANOVA of steps two and three of alternative finance moderated multiple regression of efficiency on managerial competency in archetypes 0M, 1M, 2M and 3M respectively.

On Table 4.16, archetypal 0M is an ANOVA of a regression run of efficiency on managerial competency. Two-way analysis of variance (ANOVA) isolates systematic data variability separate from random variability in data sets. It establishes the type of relationships between and among multiple data sets by use of the systematic variability. The imperative in an ANOVA table is the significance of the F Statistic. From the ANOVA Table 4.16, archetypal 0M the linear regression F-test has the null hypothe-

sis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). The study found out that the F-test statistic (104.982) is highly significant, since P-value <0.05. The study therefore, rejected H_0 and accept the alternative that the model explains the variance in the dependent variable to a significant level.

Table 4.16, archetypal 2M displays ANOVA table for alternative finance moderated multiple regression of efficiency on managerial competency. In ANOVA Table 4.16, archetypal 2M the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (18.050) is highly significant, where P-value <0.05. Therefore, the study rejected the null hypothesis and concluded that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

Table 4.16 archetypal 2M has ANOVA Table for alternative finance moderated multiple regression of efficiency on managerial competency. In ANOVA Table 4.16, archetypal 0M, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (15.757) is highly significant, where P-value <0.05. Therefore, the study rejected the null hypothesis and concluded that the model has predictive power, since it explains to a significant level, the variations in efficiency level of an SME.

Table 4.16 archetypal 2M showing ANOVA for alternative finance moderated multiple regression of efficiency on managerial competency. In ANOVA Table 4.16, archetypal 0M, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (18.812) is highly significant, where P-value <0.05. Therefore, the study rejects the null hypothesis and hence concluded that the model has moderating power, since it explains to a significant level, the variations in efficiency level of an SME.

4.8.3 Coefficients Table for Influence of Managerial Competency on Efficiency of SMEs in Kenya

Table 4.16 presents four archetypes of coefficients in testing the influence of managerial competency on efficiency of SMEs in Kenya. Regression run for efficiency on managerial competency, for multiple regression of efficiency on managerial competency and for steps two and three of alternative finance moderated multiple regression of efficiency on managerial competency in archetypes 0M, 1M, 2M and 3M respectively.

On Table 4.16, archetypal 0M are coefficients of the regression run of efficiency on managerial competency of SMEs. Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.16, archetypal 0M, observe that for the predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: managerial competency regression coefficient was positive and significant as well ($\beta = 0.150$, $t\text{-value} = 10.246$, $P < 0.05$). Therefore, then the null hypothesis of no relationship is rejected, accepting the alternative $H_{14, M}$. Consequently, the study concluded that a positive relationship between the predictor variables and the dependent variable does exist.

Coefficients Table 4.16, archetypal 2M presents MMR of alternative finance on managerial competency – efficiency relationship of SMEs in a hierarchical multiple regression process (step1). Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.16, archetypal 0M, the study observes that for all the predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Education regression coefficient is positive and significant with ($\beta = 0.218$, $t\text{-value}$

=2.721, P<0.05); experience regression coefficient is positive and significant with (β = 0.331, t-value =4.128, P<0.05); innovation regression coefficient is positive and significant with (β = 0.215, t-value =2.880, P<0.05).

Therefore, then null hypotheses of no relationship are rejected, accepting the alternatives $H_{14, MU}$. $H_{14, MX}$. $H_{14, MI}$. Consequently, the study concludes that a positive relationship among the managerial competencies - predictor variables (education; experience & Innovation) and the dependent variable, efficiency, does exist.

Since there are significant variables in step 1 above, the study escalates to step 2 where the moderator is introduced into the equation. The study deploys equation 3.9 as adopted.

Coefficients Table 4.16, archetypal 3M presents alternative finance moderated multiple regression of efficiency on managerial competency of SMEs in a hierarchical multiple regression process (step 2). Before considering the coefficients in such a summary, of vital importance is the significance of the t-values. From the coefficients Table 4.16, archetypal 0M, observe that for all the variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: education regression coefficient was positive and significant with (β = 219, t-value =2.799, P<0.05); experience regression coefficient was positive and significant with (β = .310, t-value =3.924, P<0.05); innovation regression coefficient was positive and significant with (β = .181, t-value =2.443, P<0.05); Alternative finance regression coefficient was positive and significant with (β = .189, t-value =2.564, P<0.05).

Therefore, then null hypotheses of no relationship are rejected, accepting the alternatives $H_{14, MU}$. $H_{14, MX}$. $H_{14, MI}$. Consequently, it is concluded that a positive moderating influence of alternative finance impacting relationship between managerial competency (education, experience, & innovation), and the dependent variable - efficiency does

exist. Since there are some significant variables from step two, it is acceptable now to load the moderator on all significant variables using the model 3.5 as adopted.

From the coefficients Table 4.16, archetypal 3M for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency, it is observed that for the three predictor variables and the three moderated variables, and the moderator, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Education regression coefficient was positive and significant as well ($\beta = .052$, t-value = 2.833, $P < 0.05$); experience regression coefficient was positive and significant ($\beta = .047$, t-value = 3.034, $P < 0.05$); Innovation regression coefficient was positive and significant ($\beta = .027$, t-value = 2.118, $P < 0.05$); Alternative finance regression coefficient was positive and significant ($\beta = .468$, t-value = 6.388, $P < 0.05$; education x Alternative finance regression coefficient was positive and significant ($\beta = .037$, t-value = 2.194, $P < 0.05$; experience x alternative finance regression coefficient was positive and significant ($\beta = .042$, t-value = 2.861, $P > 0.05$; innovation x alternative finance regression coefficient was positive and significant ($\beta = .027$, t-value = 2.108, $P > 0.05$).

Therefore, then for education, experience and innovation, the null hypotheses of no relationship are rejected, accepting the alternatives $H_{14, MU}$. $H_{14, MX}$. $H_{14, MI}$. Consequently, the study finds that AF does moderate managerial competency's (education, experience and innovation) relationships with efficiency.

Table 4. 16: Analysis of Variance and t-test Coefficients for Regression of Efficiency on Managerial Competency, and for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
0(M) ^a	Regression	1.872	1	1.872	104.982	.000 ^b
	Residual	2.389	134	.018		
	Total	4.261	135			
1(M) ^b	Regression	1.245	3	.415	18.050	.000 ^b
	Residual	3.012	131	.023		
	Total	4.257	134			
2(M) ^c	Regression	1.390	4	.348	15.757	.000 ^b
	Residual	2.867	130	.022		
	Total	4.257	134			
3(M) ^d	Regression	2.167	7	.310	18.812	.000 ^b
	Residual	2.090	127	.016		
	Total	4.257	134			
t- test Coefficients						
Model	Variable	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
0M ^a	(Constant)	.304	.061		4.989	.000
	Competency	.150	.015	.663	10.246	.000
1M ^b	(Constant)	.246	.094		2.609	.010
	Education	.055	.020	.218	2.721	.007
	Experience	.072	.018	.331	4.128	.000
	Innovation	.041	.014	.215	2.880	.005
2M ^c	(Constant)	.285	.094		3.050	.003
	Education	.056	.020	.219	2.799	.006
	Experience	.068	.017	.310	3.924	.000
	Innovation	.035	.014	.181	2.443	.016
	AF	.034	.013	.189	2.564	.011
3M ^d	(Constant)	.429	.083		5.141	.000
	Education	.052	.018	.206	2.833	.005
	Experience	.047	.015	.214	3.034	.003
	Innovation	.027	.013	.143	2.118	.036
	AF	.468	.073	.2644	6.388	.000
	AF x Education	.037	.017	.904	2.194	.030
	AF x Experience	.042	.015	1.010	2.861	.005
	AF x Innovation	.027	.013	.582	2.108	.037

- e) Dependent Variable: Efficiency; Predictor: Managerial Competency
- f) Dependent Variable: Efficiency; Predictors: Innovation, Education, Experience
- g) Dependent Variable: Efficiency. Predictors: Innovation, Education, Experience. Moderator - Alternative Finance.
- h) Dependent Variable: Efficiency. Predictors: Innovation, Education, Experience. Moderator - Alternative Finance. Interaction Variables: AF x Innovation, AF x Education, AF x Experience.

Substituting the coefficients into the initial moderated multiple linier regression equation, the obtaining becomes;

$$Ei = 0.429 + 0.052U_i + 0.047X_i + 0.027I_i + 0.468AF_i + 0.037(U_iAF_i) + \\ .042(X_iAF_i) + 0.027(I_iAF_i) + \varepsilon_{22} \dots \dots \dots \dots \dots \dots \dots \quad 3.5$$

Where:

E Efficiency

I_i Innovation

X_i Experience

AF_i Alternative finance (AF)

U_i Education

ε_{22} Error term

From Table 4.17, notice that the overall predictive power (R-Square) of the model improves by 20.6 % form the initial adjusted R² of 27.6 percent to a new high of 48.2%. Introducing AF to moderate education, experience and innovation will significantly impact efficiency positively. This implies that alternative finance has a moderating influence on managerial competency-efficiency relationship for SMEs, since it increases the equation predictive power of education, experience and innovation by 20.6%. the stepwise increase is 27.6% in step one, 3.0% in step 2 and 17.6% in step three.

Table 4. 17: Summary of R-Square Predictive Power – Managerial Competency

Moderated Regression Step	Adjusted Square	R-Change	Education	Sig P<0.05 Experience	Innovation
1	27.6	27.6	Yes	Yes	Yes
2	30.6	3.0	Yes	Yes	Yes
3	48.2	17.6	Yes	Yes	Yes

4.9 Results of Test of Robustness

This study found it necessary to conduct a robustness test by employing an alternative model, to guard against possible spurious results. The appropriate alternative model - Partial Least Squares Structural Equation Modelling (PLS-SEM) was used. The structural equation modelling was conducted using the PLS to construct a conceptual model linking the variables under study. This study followed the two-step approach for SEM that is, the confirmatory measurement model and the confirmatory structural model as outlined by Anderson and Gerbing (1988). Sirivanh and Sukkabot (2014) adopted the two stage SEM approach consisting of confirmatory measurement model and confirmatory structural model in their study, as did Byrne (2010) and Ndung'u, Wanjau, Gichira and Mwangi (2017).

The figures in parenthesis are LP comparatives derived in this study. Like triangulation, the robustness test seeks to model solutions from more than one model and then compare the outcome and final decisions using respective decision criteria. Objective four was employed. The objective set out to find out how managerial competency influences efficiency of SMEs in Kenya. The null hypothesis was:

H_{04} : Managerial competency has no significant influence on efficiency of SMEs in Kenya,

4.9.1 Influence of Managerial Competency on Efficiency

From Table 18, the study observes a P-value < 0.05 at 0.000 (0.000) for managerial competency, therefore it is significant. From Figure 4.5, observe the t-value is > 1.96 at 7.544 (10.2), therefore within the acceptable region of the two-tailed test. We therefore reject the null hypothesis that managerial competency has no significant influence on efficiency of SMEs in Kenya and adopt the alternative. From Figure 4.5, the

study can make a deduction that managerial competency can explain 43.9% (43.9%) of all the variations of efficiency in SMEs in the manufacturing sector in Kenya. From Figure 4.5, notice the Beta value for managerial competency is 0.663 (0.663). The regression equation then takes the values and form thus:

Figure 4.5, shows path coefficients for alternative finance moderated multiple regression of efficiency on managerial competency. The study can deduce that managerial competency can explain 43.9% (43.9%) of all the variations of efficiency in SMEs in the manufacturing sector in Kenya. Further, that the beta value for managerial competency is 0.663 (0.663)

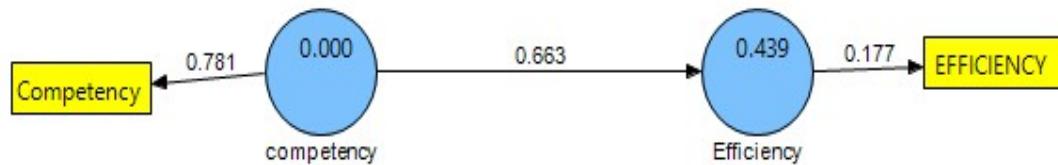


Figure 4.5: Path Coefficients for Alternative Finance Multiple Regression of Efficiency on Managerial Competency

Figure 4.6 presents t-values for alternative finance moderated multiple regression of efficiency on managerial competency.

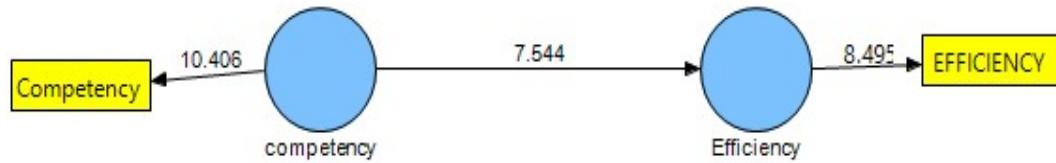


Figure 4.6: t-values for Alternative Finance Multiple Regression of Efficiency on Managerial Competency

Table 4.18 represents regression weight for alternative finance moderated multiple regression of efficiency on managerial competency.

Table 4. 18: Regression Weight for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

	Beta	Standard Deviation	Standard Error	T Statistics	P values
Competency -> Efficiency	0.6628	0.0879	0.0879	7.544	0.000

4.9.2 The Moderating Influence of Alternative Finance on the Relationship between Managerial Competency and Efficiency

Objective set out to find out how alternative finance moderated the efficiency - managerial competency relationship. The null hypothesis was:

H_{04} : Alternative finance has no significant moderating influence on efficiency - managerial competency relationship for SMEs in Kenya,

From Table 19, the study observes a P-value < 0.05 at 0.000 (0.000) for competency, therefore significant; a P-value < 0.05 at 0.000 (0.000) for Competency \times AF, therefore significant. Further, the study observes from Figure 4.8, t-value is > 1.96 at 7.165 (5.688), for competency; t-value is > 1.96 at 12.57 (6.171), for Competency \times AF. These t-values are within the acceptable region of the two-tailed test.

We therefore reject the null hypothesis that alternative finance has no significant moderating influence on efficiency - managerial competency relationship for SMEs in Kenya and adopt the alternative. From Figure 4.7, the study can then deduce that managerial competency can explain 58.5% (58.5%) of all the variations of efficiency in SMEs in the manufacturing sector in Kenya. Further, from Figure 4.7, notice the Beta value 0.393 (0.089), for competency; 2.066 (0.087), for Competency \times AF. The regression model now takes the form and values thus:

$$Ei = 0.3926M_i - 2.232AF_i + 2.0664(M_iAF_i) + \varepsilon_{22} \dots \quad 3.5$$

Figure 4.7 presents path coefficients for the alternative finance moderated regression of efficiency on managerial competency.

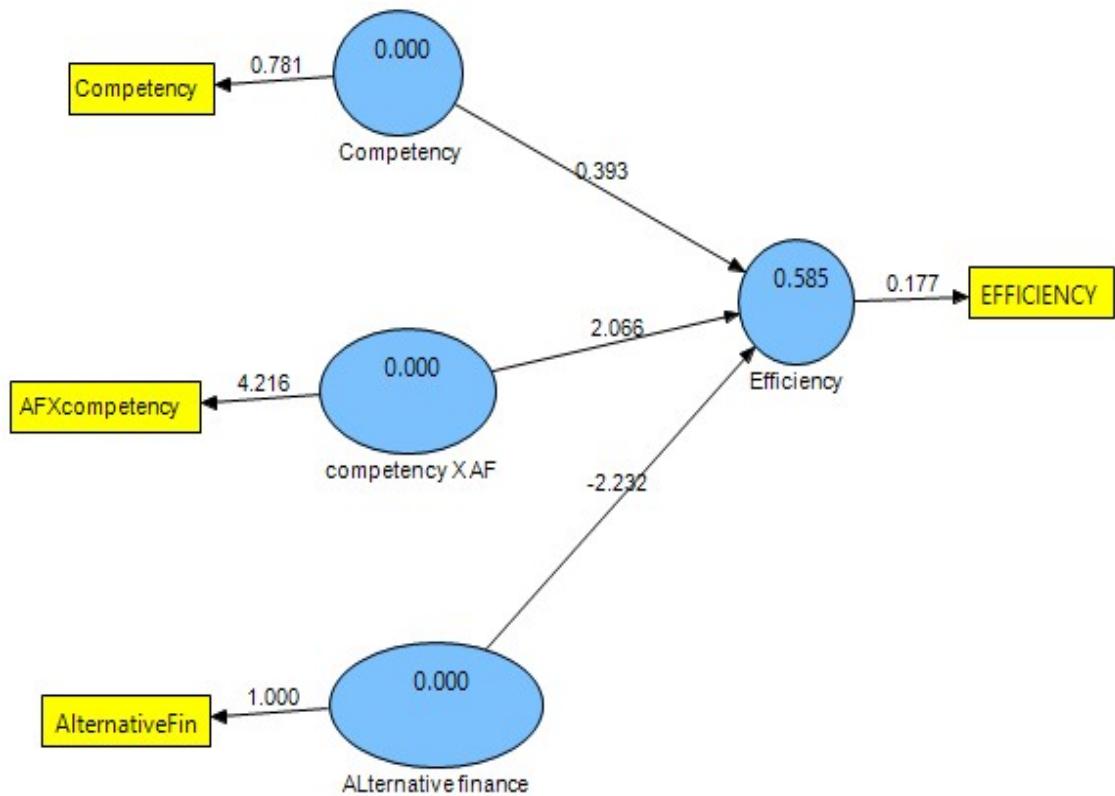


Figure 4.7: Path Coefficients for the Moderated Competency

Figure 4.8 presents t-values for alternative finance moderated multiple regression of efficiency on managerial competency. All the t-values are > 1.96 and within the acceptable region of a two-tailed test.

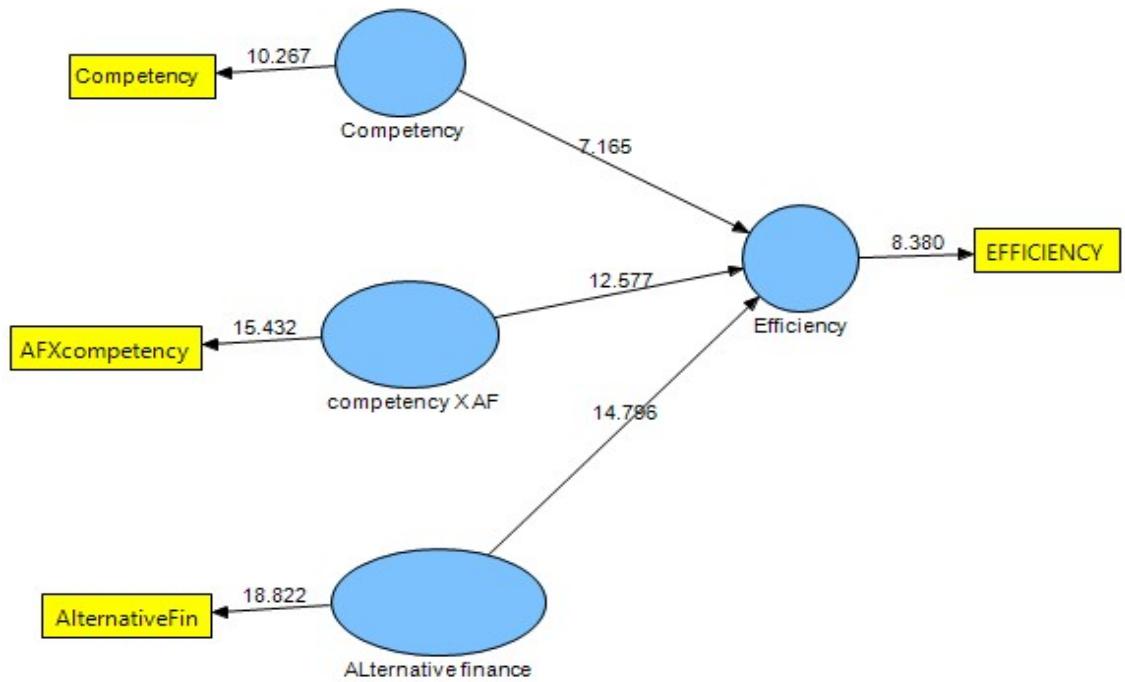


Figure 4. 8 t-values for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Table 4.19 is a regression weight for alternative finance moderated multiple regression of efficiency on managerial competency.

Table 4. 19: Regression Weight for Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
Alternative finance -> Efficiency	-2.232	0.1509	0.1509	14.7957	0.000
Competency -> Efficiency	0.3926	0.0548	0.0548	7.1645	0.000
competency X AF -> Efficiency	2.0664	0.1643	0.1643	12.577	0.000

4.9.3 The Overall Moderating Influence of Alternative Finance on the Relationship between Managerial Competency and Efficiency.

Objective set out to find out how alternative finance moderated the efficiency - managerial competency relationship. The null hypothesis was:

H_{04} : Alternative finance has no overall significant moderating influence on efficiency - managerial competency relationship for SMEs in Kenya,

From Table 20, the study observes P-value < 0.05 at 0.062 (0.030) for Education × AF, therefore significant; P-value < 0.05 at 0.001 (0.005) for Experience × AF, therefore significant; P-value < 0.05 at 0.041 (0.037) for Innovation × AF, therefore significant. All P-values < 0.05 are significant. Further, from Figure 4.10, t-value is > 1.96 at 1.88 (2.19), for Education × AF; t-value is > 1.96 at 3.45 (2.86), for Experience × AF; t-value is > 1.96 at 2.06 (2.11), for Innovation × AF. Six of the seven t-values are within the acceptable region of the two-tailed test. For the six variables, we therefore reject the null hypothesis that managerial competency has no significant moderating influence on efficiency - managerial competency relationship for SMEs in Kenya and adopt the alternative. However, alternative finance does not moderate education-efficiency relationship.

Consequently, from Figure 4.9, we deduce that managerial competency can explain 50.5% (50.9%) of all the variations of efficiency in SMEs in the manufacturing sector in Kenya. Further, from Figure 4.9, we observe beta value of 0.975 (0.37), for education × AF; 1.054 (0.42), for experience × AF; 0.436 (0.027), for innovation × AF. The resultant regression equation adopts the form and values thus:

$$Ei = 0.2013U_i + 0.2103X_i + 0.1508I_i - 2.6135AF_i + 0.9746(U_iAF_i) + 1.0547(X_iAF_i) + 0.4366(I_iAF_i) + \varepsilon_{22} \dots \quad 3.5$$

Where:

E Efficiency

I_i Innovation

X_i Experience

AF_i Alternative finance (AF)

U_i Education

ε_{22} Error term

Figure 4.9 presents path coefficients for overall alternative finance moderated multiple regression of efficiency on managerial competency.

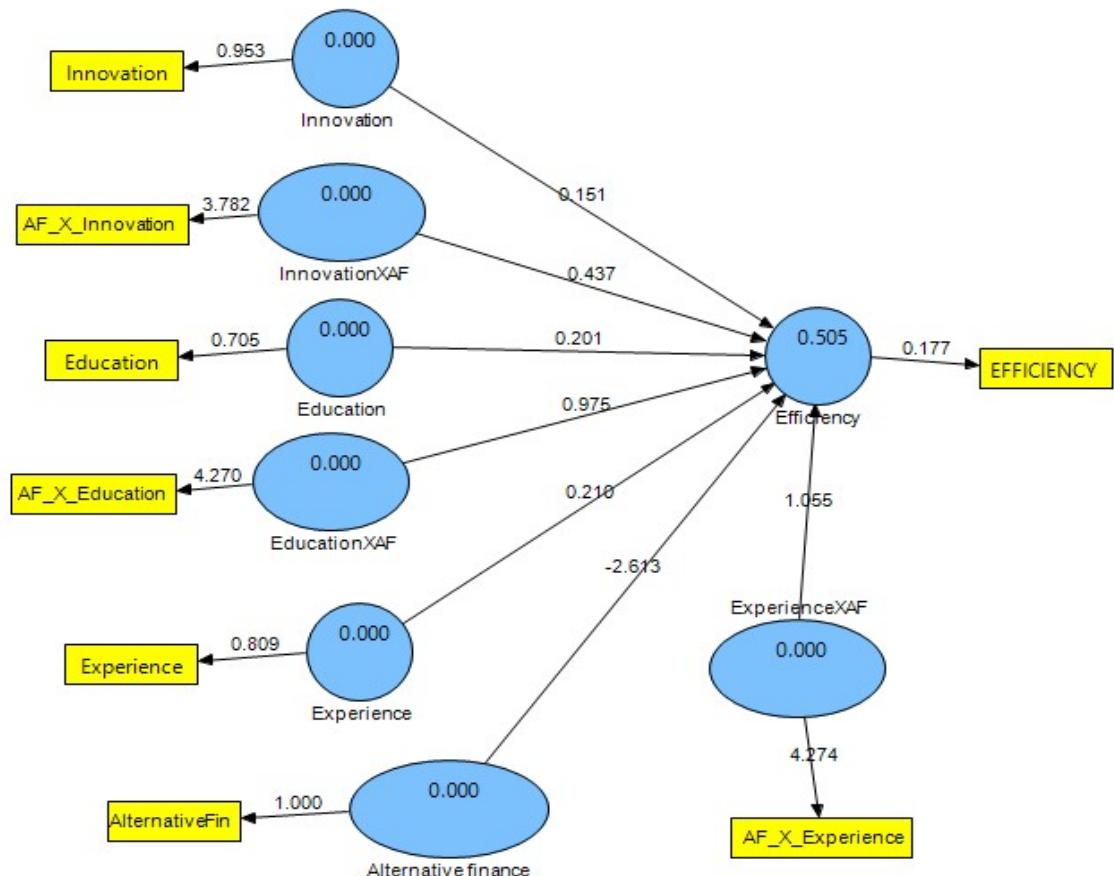


Figure 4.9: Path Coefficients for Overall Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Figure 4.10 represents t-values for overall alternative finance moderated multiple regression of efficiency on managerial competency. Six out of the seven t-values are > 1.96 , therefore falls within the acceptable region of the two-tailed test. The t-value for education \times alternative finance is 1.879, therefore just below the acceptable region.

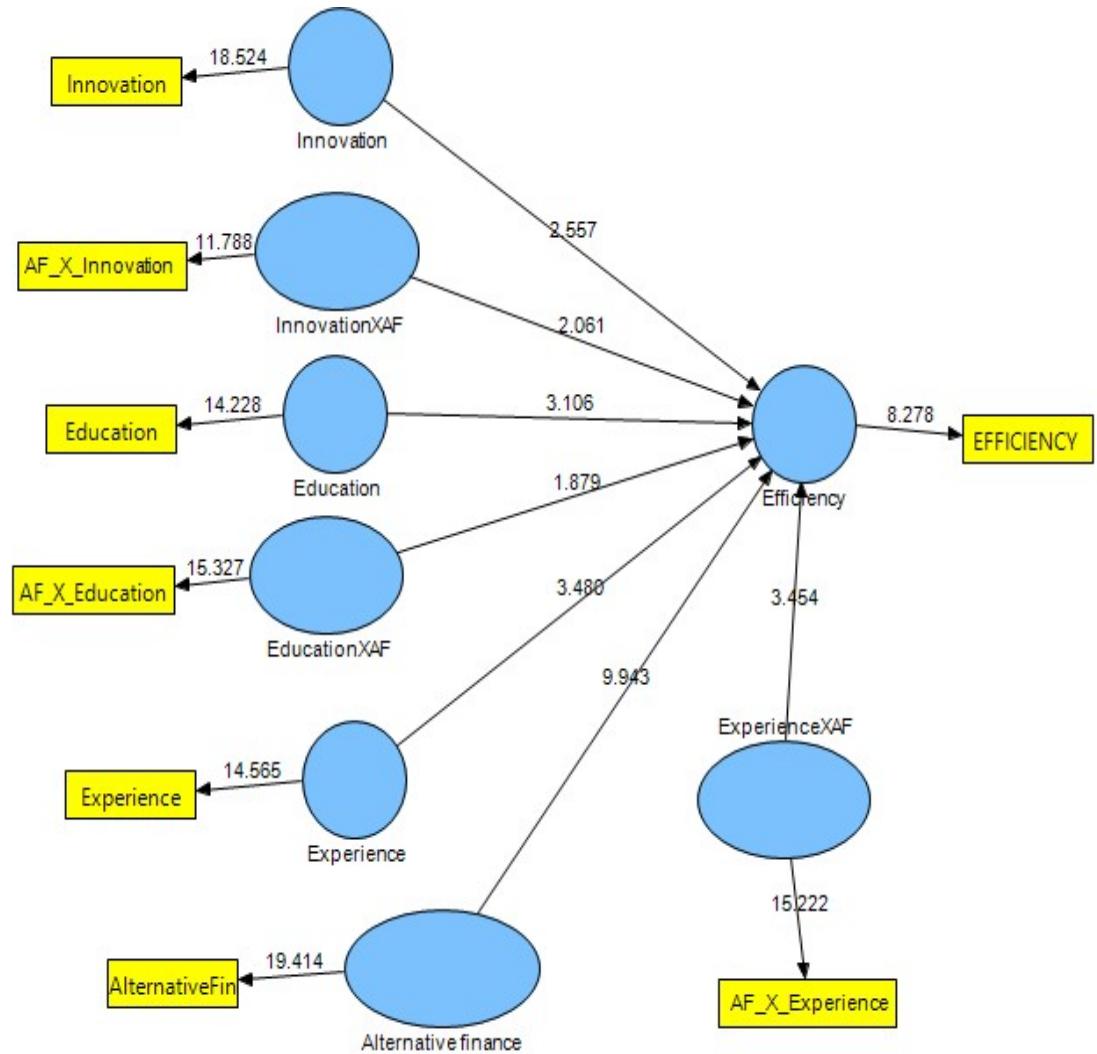


Figure 4. 10: t-Values for Overall Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Table 4.20 is a summary of regression weight for overall alternative finance moderated multiple regression of efficiency on managerial competency.

Table 4. 20 Regression Weight for Overall Alternative Finance Moderated Multiple Regression of Efficiency on Managerial Competency

Path	Beta	Standard Deviation	Standard Error	T statistics	P values
Alternative finance -> Efficiency	-2.6135	0.2629	0.2629	9.9429	0.000
Education -> Efficiency	0.2013	0.0648	0.0648	3.1059	0.002
Education X AF -> Efficiency	0.9746	0.5186	0.5186	1.8794	0.062
Experience -> Efficiency	0.2102	0.0604	0.0604	3.4805	0.001
Experience X AF -> Efficiency	1.0547	0.3053	0.3053	3.4543	0.001
Innovation -> Efficiency	0.1508	0.059	0.059	2.5573	0.012
Innovation X AF -> Efficiency	0.4366	0.2118	0.2118	2.0612	0.041

In summary, this study performed a partial least squares-structural equation modelling to test robustness of the results. Outcome relating to the direction and strength of the relationship and test of significance were consistent with those of the multiple linear regression (MLR) model. The results relating to the influence of managerial competency on efficiency regression were: R-square =43.9, t-value>1.96 and p-value < 0.05. On the other hand, results for moderation of alternative finance on the interaction of predictor variables with dependent variable (efficiency) were: R-square =50.5. t-values>1.96 and p-values < 0.05 as shown in Table 4.21.

Table 4. 21: Comparison of MLR/SEM Models Results

t-value Influence of Managerial Competency on Efficiency		t-values of the interaction of Alternative Finance with Predictor Variables			
Variables	Models		Variables	Models	
	LR	SEM		MLR	SEM
Managerial Competency	10.2***	7.544***	Education × AF	2.19**	1.88*
			Experience × AF	2.86***	3.45***
			Innovation × AF	2.11**	2.06**

(***), (**), (*) Results significant at 1%, 5% and 10% level of significance respectively

R- square result for the Influence of Managerial Competency on Efficiency Models		R- square result for the interaction of Alternative Finance with Predictor Variables Models	
LR	SEM	MLR	SEM
43.9%)	43.9%	50.9%	50.5%

4.10. Hypothesis Testing of The Overall Moderating Influence of Alternative Finance on the Relationship between Firm Characteristics and Efficiency of SMEs

Objective five was to evaluate the moderating influence of alternative finance on the relationship between characteristics (size, age & managerial competency) and efficiency of SMEs in Kenya. The study employed Hierarchical Multiple Regression (HMR) model fitting strategy using Moderated Multiple Regression (MMR). MMR is a type of regression model that have moderator variables and their interactions with other predictor variables. In our case, (HMR model 1, 2 &3) were employed.

The study adopted a hypothetical stance that alternative finance (AF) moderated the relationship between efficiency and firm characteristics in small and medium-size enterprises (SMEs). To test this thought, the stepwise process was adopted.

$H_{05,R}$: Alternative finance has no significant moderating influence on the relationship between SME characteristics and efficiency of SMEs in Kenya.

Against the alternative hypothesis:

$H_{15,R}$: Alternative finance has significant influence on the relationship between characteristics and efficiency.

The underlying null hypotheses in the firm characteristics construct were:

$H_{05,S}$: Alternative finance has no significant moderating influence on the relationship between firm size and efficiency of SMEs in Kenya.

$H_{05,G}$: Alternative finance has no significant moderating influence on the relationship between firm age and efficiency of SMEs in Kenya.

$H_{05,M}$: Alternative finance has no significant moderating influence on the relationship between managerial competency and efficiency of SMEs in Kenya.

This was carried out using the three steps methodology as in Helm, & Mark, (2012).

Further, the dependent - independent variables relationship model used was: Step 1, Equation 3.12, Step 2: Equation 3.13, Step 3: Equation 3.14, in the hypothesis testing process outlined in 3.10.

This is a two-tailed test. The decision criteria in testing hypothesis, if computed p-value < the level of significance, then the null hypothesis is rejected. Consequently, we conclude that a relationship does exist, accept $H_{15,R}$ and conclude that there is significant relationship between SMEs characteristics and efficiency of SMEs in the manufacturing sector in Kenya. To evaluate the moderating influence of alternative finance on the relationship between characteristics, (size, age, managerial competency) and organizational efficiency of SMEs in Kenya. $H_{04,R}$ Alternative finance has no significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya. This was done using the three steps methodology as in Helm, & Mark, (2012). This section adopts the hypothesis process and formulae outlined in 3.10.

Level 1 establish initial model relationship without moderator.

The dependent - independent variables relationship model used was: Equation 3.12
(Adapted from Helm, & Mark, 2012).

Introduce moderator to level 1,

$$Ei = \alpha_{21} + \beta s_{21} S_i + \beta g_{21} G_i + m M_i + \beta af_{21} AF_i + \varepsilon_{21} \dots \quad 3.13$$

In equation 3.12, the overall model should be significant in addition to AF and at least one of the predictor variables.

MLR regression and MMR Step one hypothesis:

$H_{05,R}$: There is no overall relationship between SME Characteristics and Efficiency

Step 2 Hypothesis testing process.

Null hypothesis:

$H_{05,R}$ Alternative finance has no significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya.

Was used against the alternative:

$H_{15,R}$ Alternative finance has significant moderating influence on the relationship between characteristics and efficiency of SMEs in the manufacturing sector in Kenya.

Step 3, Null hypothesis:

$H_{05,R}$ Alternative finance has no significant moderating influence on the relationship between characteristics and efficiency of SMEs in Kenya.

Was used against the alternative:

$H_{15,R}$ Alternative finance has significant moderating influence on the relationship between characteristics and efficiency of SMEs in the manufacturing sector in Kenya.

4.10.1 Model Summary for Regression of Efficiency on Operational Characteristics and for Alternative Finance Overall Moderated Multiple Regression of Efficiency on SME Characteristics.

Table 4.22 shows the archetypes of the model summary for testing overall moderated multiple regression of alternative finance on the relationship between SME characteristics and efficiency of SMEs in Kenya. The results of the multiple regression of efficiency on SME characteristics, and those of steps two and three of alternative finance moderated multiple regression of efficiency on SME characteristics in archetypes 1R, 2R and 3R respectively.

Of importance here is the strength and direction of R, and the adjusted R^2 value. From Table 4.22 model .1R for regression of efficiency on operational characteristics, the study observed a strong positive correlation coefficient R of 0.764. Further, observe that an adjusted model can explain about 57.4% of the variations in level of efficiency

in SMEs, given adjusted $R^2 = 0.574$. The model summary Table 4.22 model 2R of a moderated multiple regression run for alternative finance overall moderated multiple regression of efficiency on SME characteristics. A vital aspect of the model summary is the adjusted R^2 which indicates the predictive power of the model.

From the model summary in Table 4.22, this study observes a strong positive correlation coefficient R of 0.833. An adjusted model can explain about 67.9% of the variations in level of efficiency in SMEs, given adjusted $R^2 = 0.679$. Below is a model summary Table 4.22 of a moderated multiple regressions run for effect of alternative finance on operational characteristics - efficiency relationship. From the summary of the model in Table 4.22, a strong positive correlation coefficient R of 0.801 is observed. An adjusted model can explain about 63.1% of the variations in the level of efficiency in SMEs.

Table 4. 22: Model Summary for Regression of Efficiency on Operational Characteristics and for Alternative Finance Overall Moderated Multiple Regression of Efficiency on SME Characteristics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1(R) ^a	.764	.584	.574	.11589
2(R) ^b	.801	.642	.631	.10798
3(R) ^c	.833	.693	.679	.10065

(a) Dependent Variable - Efficiency: Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log.

(b) Dependent Variable - Efficiency: Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log. Moderator - Alternative Finance.

(c) Dependent Variable - Efficiency: Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log. Moderator - Alternative Finance. Moderator interactions: AF × Managerial Competency AF × Firm age; AF × Size - SI log.

4.10.2 Analysis of Variance (ANOVA) for Regression of Efficiency on Firm Operational Characteristics of SME and Alternative Finance Overall Moderated Multiple Regression of Efficiency on SME Characteristics.

Table 4.23 illustrates the archetypes of the Two-way analysis of variance (ANOVA) for testing overall alternative finance moderated multiple regression of relationship

between SME characteristics and efficiency of SMEs in the manufacturing sector in Kenya. The ANOVA results of a multiple regression of efficiency on SME characteristics construct, and ANOVA of steps two and three of alternative finance moderated multiple regression of efficiency on SME characteristics in archetypes 0R, 1R, 2R and 3R respectively.

Two-way analysis of variance (ANOVA) isolates systematic data variability separate from random variability in data sets. It establishes the type of relationships between and among multiple data sets by use of the systematic variability. The imperative in an ANOVA table is the significance of the F Statistic. From the ANOVA Table 4.23, archetypal 1R, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). The study found out that the F-test statistic (61.75) is highly significant, since P-value <0.05. The study therefore, rejected H_0 and accept the alternative that the model explains the variance in the dependent variable to a significant level.

From the ANOVA Table 4.23 model 2R, the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). The study finds that the F-test statistic (58.612) is highly significant, since P-value <0.05. the study therefore, may conclude that the model has moderating power, since it explains to a significant level, the efficiency level of an SME.

From the ANOVA Table 4.23, model 3R the linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). We find that the F-test statistic (41.651) is highly significant, since P-value < 0.05. Therefore, the model has predictive power, since it explains to a significant level, the efficiency level of SMEs.

4.10.3 Coefficients for Testing Overall Moderating Influence of Alternative Finance on the Relationship between Firm Characteristics and Efficiency of SMEs

Table 4.23 presents archetypes of coefficients in testing the overall moderating influence of alternative finance on the relationship between firm characteristics and efficiency of SMEs in Kenya. First for multiple regression of efficiency on characteristics and for steps two and three of alternative finance moderated multiple regression of efficiency on SME characteristics in archetypes, 1R, 2R and 3R respectively.

The coefficients Table 4.23 presents the results for the three steps of AF moderation on the relationship between operational characteristics and efficiency of SMEs in a hierarchical multiple regression process. Before considering the coefficients in such a summary, of vital importance is the significance of the t-values.

From the coefficients Table 4.23, model 1R, observe that for all the three predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically: Firm age regression coefficient was positive and significant as well ($\beta = 0.003$, t-value = 5.346, $P < 0.05$); Firm size regression coefficient was positive and significant as well ($\beta = 0.176$, t-value = 5.389, $P < 0.05$); competency regression coefficient was positive and significant as well ($\beta = 0.118$, t-value = 8.639, $P < 0.05$). Therefore, then the null hypothesis of no relationship is rejected, accepting the alternative $H_{15, R}$. Consequently, the study concluded that a positive relationship between the predictor variables and the dependent variable does exist.

Notice outcome of step 2 from the coefficients Table 4.23, model 2R, it is observed that for the moderator and all the three predictor variables, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically, firm age

regression coefficient is positive and significant with (β – value = .361; t-value =6.450, P<0.05); Firm size regression coefficient is positive and significant with (β – value = .907; t-value =6.209, P<0.05); management competency regression coefficient is positive and significant with (β –value = .458; t-value =7.957, P<0.05); Alternative finance regression coefficient is positive and significant with (β –value = .770; t-value =4.588, P<0.05); Therefore, then the null hypothesis of no relationship is rejected accepting the alternative $H_{15,R}$. Consequently, the study concluded that a positive relationship between predictor and the dependent variable does exist. Also, the null hypothesis that the moderator has no relationship with the dependent variable is rejected, accepting the alternative $H_{15,R}$. Consequently, this study concludes that the moderator has a strong positive relationship with the dependent variable and has moderating capability.

Level three – load moderator effect on all variables in level 2. In step three of the calculations the study pursues to identify the moderator effect of alternative finance, using equation 3.14.

From the coefficients Table 4.23, model 3R, observe that for all the three predictor variables and two of the three moderated variables, and the moderator, the t-values are significant, since P-value observed < 0.05 the tabulated critical P-value. Specifically:

Firm age regression coefficient was positive and significant as well (β = 0.003, t-value =3.796, P<0.05); firm age \times Alternative finance regression coefficient was negative statistically not significant (β = -0.001, t-value = -0.847, P>0.05); firm size (SI) regression coefficient was positive and significant as well (β = 0.487, t-value =5.719, P<0.05); firm size x alternative finance (SI \times AF) regression coefficient was positive and significant as well (β = 0.019, t-value =2.396, P<0.05); competency regression coefficient was positive and significant as well (β = 0.172, t-value =5.195, P<0.05);

competency × Alternative finance (M × AF) regression coefficient was positive and significant as well ($\beta = 0.060$, t-value =4.557, P<0.05).

Table 4. 23: Analysis of Variance (ANOVA) and t-test Coefficients Output for Alternative Finance Overall Moderated Multiple Regression of Efficiency on SME Characteristics

ANOVA						
Model	Variable	Sum of Squares	Df	Mean Square	F	Sig.
(1R) ^a	Regression	2.488	3	0.82871	61.75	.000 ^b
	Residual	1.773	132	0.01342		
	Total	4.261	135			
(2R) ^b	Regression	2.734	4	0.68283	58.612	.000 ^b
	Residual	1.527	131	0.01165		
	Total	4.261	135			
(3R) ^c	Regression	2.954	7	.422	41.651	.000 ^b
	Residual	1.307	129	.010		
	Total	4.261	136			
t-test Coefficients						
Model	Variable	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
(1R) a	(Constant)	-1.031	.253		-4.074	.000
	Firm Age	.003	.001	.316	5.346	.000
	SI Log	.176	.033	.324	5.389	.000
	Competency	.118	.014	.519	8.639	.000
(2R) b	(Constant)	-4.265	.743		-5.738	.000
	Firm Age	.003	.001	.361	6.450	.000
	Firm Size	.584	.094	.907	6.209	.000
	Competency	.104	.013	.458	7.957	.000
	Alternative Finance	.136	.030	.770	4.588	.000
(3R) c	(Constant)	-3.337	.675		-4.946	.000
	Firm age	.003	.001	.273	3.796	.000
	SI Log	.487	.085	.898	5.719	.000
	Competency	.072	.014	.319	5.195	.000
	AF	.142	.070	.411	2.043	.043
	AF x Firm age	-.001	.001	-.087	-.847	.399
	AF x SI	.019	.008	.885	2.396	.018
	AF x Competency	.060	.013	.740	4.557	.000

(a) Dependent Variable - Efficiency; Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log.

(b) Dependent Variable - Efficiency; Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log. Moderator - Alternative Finance.

(c) Dependent Variable - Efficiency; Predictors: (Constant); Managerial Competency; Firm Age; Size - SI Log. Moderator - Alternative Finance. Moderator interactions: AF × Managerial Competency AF × Firm age; AF × Size – SI log.

Therefore, then for moderator effect on competency and firm size, the null hypothesis of no relationship is rejected, accepting the alternative $H_{15, M}$ & $H_{15, S}$. Consequently, these findings indicate that AF does moderate firm size and managerial competency relationships with efficiency. A relationship among the predictor variables the moderator and the dependent variable does exist. Further, for firm age, the study accepts the

null hypothesis that alternative finance has no moderating impact on the relationship between firm age and efficiency as shown in Table 4.24.

Table 4. 24: Summary of the Results from the Tests of Study Hypotheses Relating to Study Objective Number Five

No	Null Hypothesis	Results	Interpretation
H _{05, R}	Alternative finance has no moderating influence on the relationship between characteristics and efficiency	Two out of three interaction terms were found to be statistically significant (size and managerial competency)	Null hypothesis was rejected
H _{05, M}	The higher the alternative finance, the stronger the relationship between level of managerial competency and efficiency	Interaction terms (managerial competency and Alternative finance) were statistically significant ($p=.000 < 0.05$, $\beta=0.060$). managerial competency is a significant predictor ($p=.000 < 0.05$, $\beta=0.072$).	Null hypothesis was rejected
H _{05, S}	Alternative finance has no significant effect on the strength of relationship between size and efficiency of SME	Interaction terms (size of SME and alternative finance) were statistically significant ($p=.018 < 0.05$, $\beta=0.019$). Size is still a significant predictor ($p=.000 < 0.05$, $\beta=0.487$).	Null hypothesis was rejected
H _{05, G}	Alternative finance has no effect on the strength of relationship between firm Age and efficiency of SME	Interaction terms (firm age \times alternative finance) not statistically significant ($p=.399 > 0.05$, $\beta=-0.001$). Although age was a significant predictor ($p=.000 < 0.05$, $\beta=0.003$).	Null hypothesis not rejected

4.10.4 The Overall Relationship between Characteristics and Efficiency of SMEs in Kenya.

The fifth research objective was to establish the moderating effect of AF on the relationship between SME (organization) characteristics, (size, age, managerial competency) and operational efficiency of SMEs as summarized in Table 4.25.

Recall our initial predictor model of the form:

(Adapted from Helm, & Mark, 2012), Where:

Imputing the variables, the study then has:

Where:

E_i = Efficiency of SME_i (Where, $0 \leq E_i \leq 1$);

α_i = Intercept, a sample-wide constant;

S_i = Size of SME;

$$G_j = \text{Age of SME}_j$$

M_i = Managerial competency of SME_i;

ε_i = error term;

βs_i , βg_i , βm_i = coefficients for the respective determinants;

i = 1-to- n where there are n observations.

For every unit change in an independent variable, the dependent variable will change with the magnitude of the coefficient of the given independent variable, all other variables held constant. For example, consider age of an SME in (years), now if an SME was older by one year, then the efficiency of the SME would increase by 0.003 units, all other variables held constant. Using the standardized coefficients, then for one standard deviation change in SME age, efficiency will change by 0.316.

Table 4. 25: Summary of the Results from the Tests of Study Hypotheses

No	Null Hypothesis	Results	Interpretation
H _{05, R}	There is no significant relationship between characteristics and efficiency of SMEs.	Regression model is statistically significant (Sig.=<0.05)	The null hypothesis is rejected
H _{02, S}	The larger the SME, the higher the degree of efficiency	Variable coefficient is statistically Significant ($p=<0.05$, $\beta=0.176$)	Alternate hypothesis confirmed
H _{04, M}	The higher the level of managerial competency, the higher the degree of efficiency	Variable coefficient is statistically significant ($p>0.05$) $\beta=0.118$)	Alternate hypothesis confirmed
H _{03, A}	The older the SMES, the higher the degree of efficiency	Variable coefficient is statistically Significant ($p=<0.05$, $\beta=0.003$)	Alternate hypothesis confirmed

The overall moderating effect of alternative finance on the relationship between characteristics and efficiency of SMEs in Kenya. Imputing our findings in hypothesis testing process 4.9.8 above, recall the moderation model equation 3.5:

$$Ei = \alpha_{22} + \beta s_{22} S_i + \beta g_{22} G_i + \beta m_{22} M_i + \beta af_{22} AF_i + \beta saf(S_i AF_i) + \beta gaf(G_i AF_i) + \beta maf(M_i AF_i) + \varepsilon_{22} \dots \quad 3.5$$

Imputing the coefficients as computed, new equation becomes:

$$Ei = -3.337 + 0.487S_i + 0.003G_i + 0.172M_i + 0.142AF_i + 0.019(S_i AF_i) - 0.001(G_i AF_i) + 0.060(M_i AF_i) + \varepsilon_{22} \dots \quad 3.5$$

Where:

Ei : Efficiency

S_i : Firm size

G_i : Firm age

, M_i : Managerial competency

α_{22} = Intercept, a sample-wide constant;

AF_i = Moderating variable – AF index of SME_i;

ε_{22} = error term;

$\beta s_{22}, \beta g_{22}, \beta m_{22}, \beta af_{22}$ = coefficients for the respective determinants;

$\beta saf, \beta gaf, \beta maf$ = coefficients that indicate moderation.

From Table 4.26, this study records significant overall predictive power (Adjusted R-Square) increase of 19.7% from 48.2% to 67.9% with P<0.05. This implies that alternative finance has a total moderating influence on efficiency of SMEs, since it increases the equation variables (firm size, firm age and managerial competency) predictive power by 19.7%. the stepwise increase of the predictive power is 48.2% in step one, 14.9% in step 2 and 4.8% in step three.

Table 4. 26: Overall Moderation Summary of Change of Predictive Power

Step	R-Square	Change	Age	Sig P<0.05	
				Size	Managerial Competency
Adjusted R-Square					
1	57.4%	57.4%	Yes	Yes	Yes
2	63.1%	14.9%	Yes	Yes	Yes
3	67.9%	04.8%	No	Yes	Yes
R-Square					
1	58.4%	58.4%	Yes	Yes	Yes
2	64.2%	5.6%	Yes	Yes	Yes
3	69.3%	5.1%	No	Yes	Yes

Recall efficiency is a figure ranging between zero and 1. Notice that even if Firm age moderated was not significant, its coefficient was used in the application of the model, since it is still relevant until a new regression is run where the variable Age moderation is excluded.

CHAPTER FIVE

DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study has investigated the influence of alternative financing on the relationship between operational characteristics and efficiency of small and medium enterprises in the manufacturing sector in Kenya. This chapter discusses the findings of the study in relation to deductions, available literature, theory and opinion. In this chapter, the study draws conclusions and makes recommendations from the findings and suggests areas for further research.

5.2 Discussion of Findings

Based on empirical review, several theoretical perspectives and a positivism philosophy, a conceptual framework suggesting a moderating influence of alternative finance on characteristics-efficiency relationship was developed and pursued. Objectives and hypothesis were formulated to establish efficiency trends, and for testing influence of alternative finance on the relationship between firm characteristics and efficiency of small and medium enterprises. The DEA, MLR and MMR models were adopted. The assumptions of the models were tested and found to hold before hypothesis testing. Such tests included normality, homoscedasticity, multicollinearity and autocorrelation.

5.2.1 The Operational Efficiency of Manufacturing SMEs in Kenya.

This study found out that the Kenyan SMEs in the manufacturing sector reflect a very high average efficiency of 0.92 compared to those of Kenyan SACCOs with 0.77. Operational efficiency, the attainment of an optimal input versus output ratio, from a DEAP run got data values for SMEs ranging between 0.12 and 1. The manufacturing

industry efficiency is on an upward trend, driving the economy to a middle-level-income country. The results identify the sources and estimates the amounts of inefficiencies and would be applied by the industry in making amends to close the efficiency gap.

On the DEA findings, similar statistics have been used in similar research works such as by Mwangi (2014) who found a mean of 0.775, standard deviation of .095, with lows of 0.555 and maximum of 1 efficiency in the SACCOs in Kenya. Others such as Aw et al. (2000); Coelli et al. (2005); Farinas and Martin-Marcos (2002); Neely et al. (2001) indicated objective DEA model results. The Kenyan SMEs in the manufacturing sector reflect a very high average of .92 comparative to the SACCOs. The manufacturing industry appears to be on an upward trend to reach its potential, driving the economy forward and decimate poverty levels.

The industry SME with the lowest efficiency 0.12 has an improvement gap of 0.88 points, while the highest had a score of 1. This means that the firm with the lowest efficiency level on average has potential to increase its output by 88% while maintaining its current level of input. On the other hand, the same firm may reduce its input by a margin of 88% while maintaining its current output. The average efficiency of SMEs in the manufacturing sector in Kenya is higher than that of SACCOs in Kenya.

In line with Charnes et al. (1978), who posit efficiency as the attainment of an optimal input versus output ratio, production costs, labour costs, operating expenses and finance costs were used as inputs while production, gross margin and return on investment were used as outputs. For manufacturing SMEs in Kenya, there is need to take keen control of product costing, for it is a vital component of efficiency. In a manufacturing environment, the choice of the costing method adopted should be carefully thought-out, since production cost components - labour costs, material costs and

overhead costs, are pivotal to efficiency. The study finds that the lower the staff costs, operating expenses, finance costs, the higher the efficiency, just as was the contention in Martic et al. (2009). The higher the production the higher the efficiency.

The study notes that virtually all SMEs have a gross margin of 40% and above. ROI or return on investment is defined as the efficiency of an investment and the higher the ROI, the higher the efficiency becomes. These findings triangulate well with opinion performance ratings of overall efficiency. This study found out an above-average score on the overall opinion on improvement of the factors of efficiency. This supports the Resource Based Theory, a managerial framework to determine the strategic resources with the potential to deliver competitive advantage to a firm, such that an organization can outperform its competitors consistently over time (Barney, 2001; Hitt et al., 2009; Peng, 2006; Porter, 1985). This theory underscores the vital position finance, managerial innovativeness, competency and characteristics take in transforming manufacturing SMEs into efficient, competitive and successful firms (Laugent et al., 2008; Wernerfelt, 1984).

This is in support of the Theory of the firm, that endeavours to explain and predict the nature of the firm in relation to its reason for existence, Coase (1937), behaviour, structure and relationship to the market that a firms' economic growth rate may be sustained by the ideal proportions of three driving forces, labour, capital and technology, their cost being moderated by use of alternative finance.

Findings of this study support the endogenous growth theory on investment in human capacity. The endogenous human capacity impacted production/output positively. Further, lower labour cost impacting the price positively. This drove the ratio of output to labour costs higher, hence the high efficiency levels. This is anticipated to result to real economic growth (Aghion & Howitt, 1998).

On local business associations support to enhance efficiency, the findings of this study mirror those of the research by EIS (2005), which underscore the vital role of local business associations in achieving sustainable SME development for global economic development. This supports the study's choice to research on SME members of Kenya Association of Manufacturers. Similarly, Islamic SME financiers pursue both developmental as well as social goals in their financial contractual endeavours such as Musharakah, Murabahah and Mudarabah (Abdulsaleh & Worthington, 2013; Obaidullah & Lattif, 2008).

Further, these findings are in line with Abdulsaleh and Worthington (2013); Obaidullah and Lattif (2008), who found that majority of micro-financial institutions, just like the Islamic financiers pursue both developmental as well as social goals, in addition to sharing risk and entrepreneurship between the financier and the SME. Subhani, Hasan, Rafiq, Nayaz and Osman (2012) concur.

5.2.2 The Relationship between Size and Efficiency of SMEs in Kenya

To accomplish objective two of this study, a multiple regression of efficiency on size as well as alternative finance moderated multiple regression of efficiency on size were performed. Findings on both indicate that size has a positive influence on efficiency of manufacturing SME members of KAM. Specifically, this study has found out that alternative financing has a positive influence on firm size – efficiency relationship of small and medium enterprises members of Kenya association of manufacturers. This upholds the Pecking Order Theory which holds that capital structure is driven by firm's desire to finance new investment, first via internal sources, then via low-risk debt, and then, with equity (Myers & Majluf, 1984; Psillaki, 2008). However, these findings are in perfect contrast with the Theory of Stochastic Optimal Economic

Growth, particularly one of the model strands Gibrat (1931) postulating that firm growth is independent of firm size.

This study finds that alternative finance (AF) has a moderating influence on the relationship between firm-size and efficiency. This study also finds that alternative finance (AF) moderates total assets relationships with efficiency. Further, for turnover, this study finds that alternative finance has no moderating impact on the relationship between turnover, and efficiency. Also, for number of employees, this study finds that alternative finance has no moderating impact on the relationship between, number of employees and the dependent variable, efficiency. Therefore, use of alternative finance to impact total assets, turnover and number of employees would significantly impact efficiency positively. These findings agree with Harvie et al. (2010). This is in line with the Loanable Funds Theory (Ohlin, 1937; Robertson, 1934).

5.2.3 The Relationship between Firm-Age and Efficiency of Manufacturing SMEs In Kenya

To accomplish objective three of this study, a multiple regression of efficiency on age as well as an alternative finance moderated multiple regression of efficiency on firm age were performed. Findings on relationship indicate a positive correlation between age and efficiency while moderation indicate that age has no significant influence on efficiency of manufacturing SME members of KAM, although alternative financing had negative moderating influence on the relationship between firm-age and efficiency threshold was not statistically significant.

Specifically, alternative financing has no significant moderating influence on the relationship between firm-age and efficiency of small and medium enterprise members of Kenya association of manufacturers, although the relationship is not significant. This

is in line with Financial Growth Cycle Paradigm proposed by Berger and Udell (1998), which proposes that financial needs and options of SMEs changes as the SME “undergoes a peculiar life cycle. In their formative stages, SMEs are financed mainly through alternative finance (Abdulsaleh & Worthington, 2013; Cassar & Holmes, 2003).

Specifically, this study found out that alternative finance has no significant moderating impact on the relationship between firm age and efficiency for SME member firms of KAM, against Myers and Majluf (1984) who found a significant relationship therefrom. A possible reason would be the fact that this research used cross-sectional research design, collecting and analysing study data over short to medium-term time horizon. It is likely that panel data may have exhibited a different outcome.

The predictive power of the model improves by 10.3 %. This is from the initial adjusted R^2 of 11.9 percent to 22.2%. Older SMEs would therefore benefit more from AF. However, this benefit is not statistically significant.

The overall predictive power (R-Square) of the model improves by 10.3 % from the initial adjusted R^2 of 11.9 percent to a new high of 22.2%. Introducing AF to moderate age will not significantly impact efficiency, since $Sig P>0.05$ at step 3 and incremental deviation is negative. This implies that alternative finance has no significant moderating influence on firm age - efficiency nexus of SMEs. The increases in the equation predictive power of age of firm by 10.3%. is not consistent stepwise, increase is 11.9% in step one, 10.7% in step 2 and -0.4% in step three.

5.2.4 The Relationship between Managerial Competency and Efficiency of SMEs In Kenya

To accomplish objective four of this study, a multiple regression of efficiency on managerial competency as well as an alternative finance moderated multiple regression of efficiency on managerial competency were performed. Generally, findings on both indicate that managerial competency has a positive influence on efficiency of manufacturing SME members of KAM, and that alternative financing has a positive moderating influence on efficiency-managerial competency relationship.

Particularly, this study found out a positive managerial competency – efficiency relationship of small and medium enterprises members of Kenya association of manufacturers. These findings support the endogenous growth theory on investment in managerial capacity and entrepreneurial orientation as measured by level of innovation/adoption of technology, level of education and experience (Aghion & Howitt, 1998).

This study finds that alternative finance has a positive moderating influence on the relationship between managerial competency and efficiency. This study finds that alternative finance has a positive moderating influence on the relationship between education, a component of managerial competency, and efficiency. This study finds that alternative finance has a positive moderating influence on the relationship between experience, a component of managerial competency, and efficiency. This study finds that alternative finance has a positive moderating influence on the relationship between innovation, a component of managerial competency, and efficiency.

These findings are in perfect harmony with Schumpeterian Theory of Innovation, where the entrepreneur innovator moves the economy out of static equilibrium by use

of innovative skills (March 1991; Schumpeter, 1942). This theory demonstrates that firms attain a competitive advantage and improve efficiency if their owners and managers are innovative, skilful and informed (Uzkurt et al., 2013). Owners/managers of SMEs constantly rethink and renew the old by innovation, Brown, Davisson and Wiklund (2001), by adjusting their actions in sync with the wind of change and provide economic leadership (Bula, 2012). Innovative entrepreneurs germinate microenterprises and transit them to SMEs and beyond into the business cycle.

The robustness tests via Partial Least Squares Structural Equation Modelling PLS-SEM were found to be consistent with the earlier findings of the study by use of the moderated multiple linear (MML) regression model. This is particularly in relation to findings on relationship, direction of relationship, strength of relationship, and significance. In effect, using either of the models, the study would have arrived at the same conclusion. This way, the risk of spurious relationships was mitigated. Mburiah, (2017); Mburiah et al. (2016) researching on the same thematic area took a similar approach.

5.2.5 The Moderating Influence of Alternative Financing on the Relationship between Operational Characteristics and Efficiency of Small and Medium-Size Enterprises in Kenya.

To accomplish objective five of this study, a multiple regression of efficiency on SME characteristics as well as an alternative finance moderated multiple regression of efficiency on SME characteristics were performed. Overall findings on both indicate that there exists positive significant relationship between firm characteristics and efficiency. Further, alternative finance has moderating influence on the relationship between efficiency and some SME characteristics. Therefore, those firms that employ more

alternative finance end up more efficient than those which employ less of alternative finance in support of the theory of the firm. This study now summarises the overall moderating influence of alternative finance on the relationship between efficiency and SME characteristics - size, age and managerial competency.

This study found out a positive relationship between characteristics and efficiency, as did many studies such as Abdulsaleh and Worthington (2013); IFC (2010); Mwangi (2014); Purwanto et al. (2014); Unlucan (2010); USITC (2010). This study found out as did numerous studies that size, age and managerial competency are some of the characteristics of firms (Mwangi, 2014; Woldie et al., 2008). The results are that characteristics significantly influence efficiency of SMEs as was found by Unlucan (2010). The results indicate that, as theory predicts, size is positively related to the efficiency of SMEs. This finding is similar to the results of Abdulli (2013), Charoenrat et al. (2013); IFC (2010); Mwangi (2014); Murray and White (1983) for continental and regional firms; Gual and Clemente (1999), for British Columbia firms and Ward and McKillop (2005) for UK firms. However, Brown and O'Connor (1995); Crapp (1983) both on Australian firms had found a negative size – efficiency relationship, while Fried et al (1993) on US firms found no relationship. The average SME size in the current study is relatively small, hence a unit increase in size, for example total assets, is accompanied by less than unit increase in inputs, for example employee salaries. It is therefore, concluded that growth in size results in economies of scale and hence increased efficiency of the SMEs.

Age was found to be significantly positively related to efficiency of SMEs; that is the older the SME, the more efficient it was found to be. This is in line with the findings of Mwangi (2014) for Sub Saharan Africa - Kenya; Esho (2001) for Aus-

tralian credit unions and Ward and McKillop (2005) for UK CUs, both research works found a positive relationship between age and efficiency. However, Njeru (2013) found no significant relationship between age and performance of tour firms in Kenya while Banerjee (2014); Zhou and Wit (2009) found a negative relationship.

Managerial competency was significantly related to efficiency of SMEs. Managerial competency measured by considering directors and employee's qualifications/ knowledge) and experience or skills. The results of this study partially support the Schumpeterian theory of innovation, that managerial competency would be positively related to the efficiency of SME, though neither the major nor the only factor. The findings of this study are similar to those of Abdulsaleh and Worthington (2013); Levenson, Stede, and Cohen (2006); Nofsinger and Wang (2011), who found a positive relationship between managerial competencies and both individual and firm level performance as did Industry Canada (2003); Sanda et al. (2011).

Findings of this study support the endogenous growth theory on investment in managerial capacity and entrepreneurial orientation as measured by level of innovation/adoption of technology, level of education and experience (Aghion & Howitt, 1998). Therefore, complexity of Kenyan SMEs is at the same level with the theoretical expectations. Hence increases in qualifications and experience of directors and employees may lead to performance gains that exceed the additional costs of engaging the more competent personnel.

Owners/managers of SMEs recognizing that managerial competency was significantly related to efficiency of SMEs, they must impact managerial competency indicated by directors, managers and employee's qualifications, knowledge, ori-

tation and experience or skills. They should seek to employ well qualified staff, so as to drive the firm to greater efficiency and economic success, Abdulsaleh and Worthington (2013); Nofsinger and Wang (2011) among other writers share this opinion. Therefore, complexity of Kenyan SMEs is at the same level with the theoretical expectations of the Financial Growth Cycle Paradigm. Hence increases in size, age and managerial competencies such as qualifications and experience of directors and employees may lead to performance gains that exceed the additional costs of improving these characteristics, therefore improve efficiency and the economic fortunes of the SME.

Findings of this study contradict those of Esho (2001) in a study between efficiency, size and other determinants of Australian organizations who found a negative relationship. Similarly, Crapp (1983) found a negative efficiency-size relationship for US. Further, the findings of this study contradict those of Fried et al. (1993) who found no relationship between size and efficiency for US organizations

This study finds that alternative finance does moderate the relationship between firm size and managerial competency for manufacturing SMEs members of KAM. This is in line with the Theory of the Growth of the Firm by Penrose (1959) which employs the resource-based view (RBV). That the heterogeneity of both human and material productive services afford resources the ability to produce a variety of services which can modify the attributes of the resources and enable provision of new services.

This point to the moderating capacity of some of the resources at the disposal of a firm. Further, Penrose (1959), argues for the centrality of the managerial resource and motivation to innovate as overriding the non-human resources in the survival and growth of a firm (Storey, 1994). A relationship among the predictor variables, the

moderator and the dependent variable does exist. Further, for firm age, the study concludes that alternative finance has no moderating impact on the relationship between firm age and efficiency.

That alternative finance moderated the relationship between SME characteristics and efficiency, more specifically the size – efficiency relationship together with managerial competency and efficiency relationship. For SMEs whose level of alternative finance is higher, the effect of size on efficiency is greater than in those whose level of alternative finance is lower. This is in line with the financial intermediation theory. The transaction cost dimension impact moderating variables positively, causing a ripple effect on the predictor variable, that leads firms investing larger amounts of alternative finance to higher efficiency of SMEs (Andries & Cuza, 2009).

Harvie, Oum and Narjoko (2010) found size and the stage of development of a country as the determinants of SME's access to finance. The relationship between efficiency and finance was found to be positive by Mwangi (2014) for sub Saharan Africa and. Esho (2001) for Australian credit unions and Ward and McKillop (2005) for UK CUS. Fried et al. (1993) for US credit unions found no relationship at all. The findings of this study corroborate those of IFC (2010) studies, which conclude that SMEs at inception entirely rely on alternative (informal sources) of finance such as from personal saving, friends and MFIs. Also, Kihimbo et al. (2012) arrive at a similar conclusion.

Since the efficiency of SME was significantly related to managerial competency, alternative finance could be expected to moderate this relationship. Alternative finance had been hypothesized to moderate the interaction between Managerial competency and efficiency of SME. The study confirmed this expectation, in sup-

port of the Schumpeterian theory of innovation, partly though, for it was neither the major nor the only factor. The study had expected alternative finance to moderate firm age. This was found not to be the case.

5.3 Conclusion

This section draws a conclusion per objective and then gives a summary for the study.

5.3.1 The Operational Efficiency of Manufacturing SMEs in Kenya.

This study calculated the operational efficiency of SMEs KAM members in the manufacturing sector in Kenya. This study concludes that Kenyan SMEs in the manufacturing sector reflect a higher average efficiency of 0.92 compared to those of Kenyan SACCOs at 0.77.

5.3.2 The Relationship between Size and Efficiency of SMEs in Kenya

This study concludes that firm size was a characteristic of small and medium enterprises, in the manufacturing sector in Kenya, which positively impact their efficiency. This agrees with the theory of economies of scale. Further, the study concludes that alternative finance does moderate firm size relationships with efficiency. When size and level of alternative finance are employed together, SMEs are able to positively impact assets, turnover and also employ enough members of staff to afford specialization. With the assured lower finance costs from alternative sources, the firm is propelled with a higher momentum to higher efficiency. It enjoys economies of scale, expanded assets, satisfied customers and adequate stock. It affords to price its products competitively by lowering production costs. It is therefore imperative that provision and availability of alternative finance be enhanced to benefit SMEs.

5.3.3 The Relationship between Firm-Age and Efficiency of Manufacturing

SMEs In Kenya

This study draws a conclusion that Age is a characteristic of small and medium enterprises, in the manufacturing sector in Kenya, which positively significantly impact their efficiency. This supports the theory of economies of scale. However, since the level of alternative finance employed by SMEs did not have significant moderating impact on the efficiency of the SMEs, then for older and younger firms alike, efficiency remains indifferent of the level of alternative finance.

5.3.4 The Relationship between Managerial Competency and Efficiency of

SMEs In Kenya

This study concludes that Managerial competency is a characteristic of small and medium enterprises, in the manufacturing sector in Kenya, which positively impact their efficiency. This is in line with the financial intermediation theory where the competency of the manager in matters financial will create demand for the growth of intermediaries of the right qualities to favour SMEs.

When managerial competency and level of alternative finance are employed together, SMEs are able to positively impact experience, education and innovation in the firm, increasing SME fortunes in the short and long run. With the assured lower finance costs from alternative sources, the firm's efficiency is propelled with a higher momentum by experienced management, educated staff and innovative workforce, to new heights. These managerial competencies help the firm reduce total cost of the products, keep customers happy with latest innovations and affordable prices and help firms capture new markets. Managerial competencies when employed together with alternative finance enhances the efficiency of the firm.

5.3.5 The Moderating Influence of Alternative Financing on the Relationship between Operational Characteristics and Efficiency of Small and Medium-Size Enterprises in Kenya.

This study concludes that ultimately, SME characteristics size, age and managerial competency positively impact efficiency. This is in line with the theory of economies of scale. When SME characteristics and level of alternative finance are employed together, SMEs are able to positively impact size, age and managerial competency, and thereby improve their economic performance, manifest in improved efficiency. Managers/owners of SMEs are encouraged to source for and use alternative finance as a gearing mechanism as well as a working capital mechanism in its strategies so as to place the SME at a point of economic advantage both in the short run and in the long run.

This is in line with the financial growth cycle theory. Strategically positioned firms place themselves to take advantage of opportunities in the market place so as to not only compete and survive but also to thrive in the face of the ever-dynamic environment, competition and evolving customer demands. This is possible where the owner/manager is well informed of sources of various financial assets of affordable cost or reasonably cheap capital, dedicated and skilful workforce and a well-priced product. The owner/manager elicits market demand for loanable funds as financial instruments with reasonable costs as is postulated by the loanable funds theory.

5.3.6 Summary

In summary, this study sought to determine the efficiency level of SMEs in the manufacturing sector in Kenya. Those SMEs were found to reflect a higher average efficiency of 0.92 compared to those of Kenyan SACCOs at 0.77. Further, this study

sought to establish the relationship between specific firm characteristics and efficiency of the said firms. This study concludes that SME characteristics size, age and managerial competency are positively related to efficiency and that size, age and competency are characteristics of SME firms. This study concludes that characteristics significantly influence efficiency of SMEs.

This study concludes that alternative finance does moderate firm size relationships with efficiency and managerial competency relationships with efficiency. These findings are aligned to economic theories, financial intermediation theories, and Schumpeterian entrepreneurship theories, literature and the conceptual framework.

The initial conceptual framework contemplated both positive relationships between predictor variable and dependent variable as well as an alternative finance moderating influence on the predictor variable and dependent variable relationship. While the initial relationships were confirmed, alternative finance moderation of regression of efficiency on age of SME was found to be negative but statistically not significant, contrary to Myers and Majluf (1984).

Therefore, since the main objective of the study was to establish the influence of alternative financing on the relationship between operational characteristics and efficiency of small and medium enterprises in Kenya, by removing age of SME from the initial conceptual framework, a new one emerges. However, as is depicted on Figure 5.1, age has been sustained, showing the positive linear relationship between age and efficiency confirming objective three. The new conceptual framework shows firm size, age and managerial competency as the predictor variables, alternative finance as the moderator while efficiency is the dependent variable.

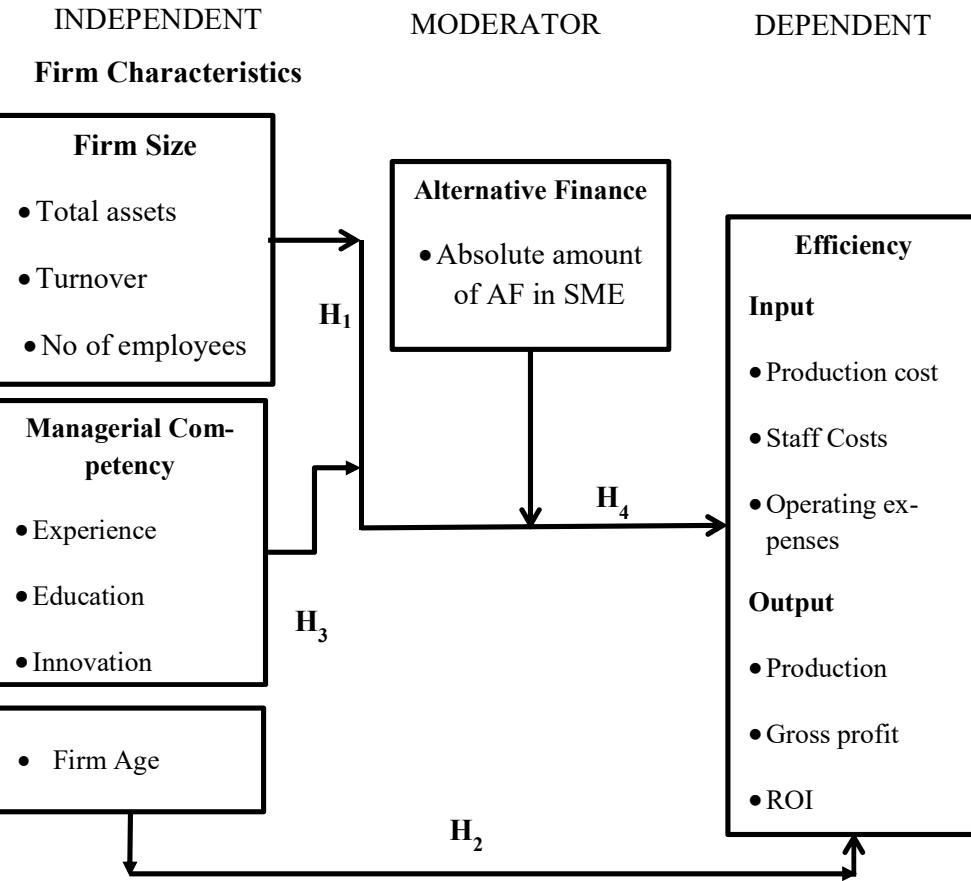


Figure 5 1: Revised Conceptual Framework

Alternative Finance is pivotal in accelerating the economic fortunes of SME firms and the economy as demonstrated by its moderating capabilities on the relationship between SME characteristics and efficiency, supported theory and empirical findings. This study concludes that it is feasible for firms to develop a pecking order for their characteristics based on the power of AF moderation of its relationship with efficiency.

That the hierarchy for this study was firm size- managerial competency-age. That KAM advocacy initiative which captures a unique technical-financial-social approach is a main driver in the changing fortunes of SMEs in the manufacturing sector. To im-

pact efficiency, endogenous AF is possible through programs such as the dividend policy. Lowering intermediation costs, opacity and germinating informal sources of credit can jumpstart the vital change needed to improve firm efficiency in developing countries as happened in China.

The findings of this study join an enormous body of pragmatic research which supports the view that financial systems are the major contributors to economic growth. It supports both demand following and supply-leading channels to achieve financial deepening, more so for emerging economies like Kenya. The findings of this study underscore the finance-growth nexus and seek to propagate new financial growth models to resolve the formal-alternative finance conundrum.

5.4 Recommendations

Alternative Finance plays a pivotal role in increasing the economic fortunes of SME firms and the economy. That AF holds the key to financial breakthrough for SMEs in Kenya and globally, understanding its critical positive linkages with characteristics and efficiency such as moderating capabilities creates impetus and guides decision process that enhances SME sustenance and excellence. While research findings give credence to academic theories and past findings, of more fundamental importance is practical solutions and innovations targeting the problem of availing meaningful alternative credit to SMEs. This section presents recommendations of the study, based on the initial objectives, findings, and eventual conclusions of the study.

- i. This study, on operational efficiency of SMEs, recommends annual industry efficiency calculation and benchmarking of current and future research with international research centres such as the World Bank and EIS (2005), which underscores the role of local business associations in achieving sustainable SME

development for global economic development. Since this research targeted members of KAM, an advocacy welfare organization, the study recommends the multi-pronged approach to organizational success, such as adopted by Kenya Association of Manufacturer. SMEs then benefit from managerial training, enhanced policy formulation advocacy, accessing market information, product quality improvement, accessing alternative finance, expanding business reach and networking.

- ii. Each SME should establish its characteristics pecking order for strategic advantage, implementing them when investing incremental alternative finance. Using the findings of this study, assuming a 3 characteristics scenario an SMEs' size would contribute the highest advantage, followed by managerial competency, then age. A pecking order would be established, such that for every extra shilling borrowed, each of the tree characteristics would get additional funding in the ratio of their coefficients in the regression equation. The higher the size of the firm, the more efficient it becomes. The more competent the employees of the firm, the more efficient the SME becomes. The older the SME, the more efficient the SME becomes.
- iii. Management/owner of SMEs work to improve size of SME by use of alternative finance capital investments both as operating capital and long-term investments. The SMEs should consider merging and consolidating resources. Also, management of SMEs may work to improve competency by continuous skill development or by engaging more competent personnel or by using alternative finance to train the workers and by engaging more experienced management. Age may come in handy when a firm is able to retain earnings over time. This

- impacts dividend policy which should favour retention of profit then high dividend pay-out ratio.
- iv. Financial experts should hold intensive trainings for SME owners/managers on the pivotal role played by alternative finance, so as to assist SMEs achieve their main objective of accelerating economic growth. The vital input in form of alternative finance needs to be enhanced and broadened for SMEs. Since the study found out a moderating influence both on size and managerial competency, this means that larger firms would benefit more from use of alternative finance. Also, firms with more competent management would become more efficient faster by use of alternative finance. SMEs should broaden the use of alternative finance to enhance income generating assets and in training or hiring managers with higher innovation, higher competency levels and longer experience.
- v. Also, Kenya Association of Manufacturers SMEs should enhance their asset base. This may be achieved by initiation of an SME enterprises support programme where government, donors and welfare representative organizations such as KAM will pool funds to: Offer loans to intermediaries for on-lending to SME-enterprises; offer business development services; support value adding to agricultural products and natural resource development and; offer institutional support and capacity building while sustaining policy advocacy. Such initiative will capture a technical-financial-social approach, thereby standing a good chance to succeed.
- vi. Further, it is recommended that Kenya Association of Manufacturers SMEs should pursue a concerted dividend policy aimed at higher profit retention to strengthen the assets base and managerial synergies going forward. This way

SMEs enhance their level of alternative finance if they retained more profits in the business instead of giving out profits as dividends. The idea of the benefits of postponing gratification and the resultant compound gains should be sold to the owners or shareholders of the Kenya Association of Manufacturers SMEs. This is in line with Endogenous Growth Theory which holds that economic growth is primarily the result of internal and not external sources (Aghion & Howitt, 1998).

To enhance AF availability, government in conjunction with welfare organizations and SMEs should open on-line information centres where marketing of SME alternative financial instruments should be traded. Subsidized loans, links with international lenders and bilateral agreements such as supply agreements can reduce finance costs and assure finance availability for SMEs. Such organizations could take the structure of a hybrid between micro-finance institutions and formal banks. This supports the financial intermediation theory which hinges on the notion that intermediaries serve to reduce transaction costs and informational asymmetries. This is to the extent of existence of information asymmetry; high transaction costs; and existing financial regulations (Allen & Santomero, 1997; Andries & Cuza, 2009).

5.5 Suggested Areas for Further Research

This study was able to demonstrate the vital link between alternative finance and efficiency of SME member firms of KAM. Further studies extending the view to include a wider spectrum of SMEs such as members of KEPSA and even other industries would be vital for such studies can eliminate narrow informant biases while adding confirmatory literature. Wide studies build wider acceptance, generalization and implementation of recommendations. Success of such implementation would also be assured.

One aspect of this study was that it relied on cross-section data survey where respondents' opinion on the items in the instruments was sought. While relationships were established, causality between variables, such as management competency, SME size, SME age and efficiency were not pursued, further research extending this work is recommended. Such a study should be longitudinal, spanning over a considerable period of time to establish causality. The main drivers would however be the investment of time and other resources imperative in such an endeavour. Such studies would provide necessary depth of knowledge and proximity of findings to the actual situation, enhancing success of implementation of recommendations.

Pursue Econometric Studies

Since this study used the DEA method in assessing efficiency, it may be useful to do detailed investigation on efficiency of SMEs using any of the econometric methods such as DFA, SFA or TFA. A vital consideration before such an endeavour is adequacy of resources. Such confirmatory endeavours give credence to long used econometric methods while opening new avenues to harness the newfound link between AF and efficiency of KAM SMEs.

Quite separate from the interactions of a moderating variable with the relationship between characteristics and efficiency of SMEs, another emerging interaction is that of an intervening variable. Such research to find out the impact of relevant intervening variables impacting the characteristics and efficiency relationship are recommended so as to expand knowledge. Such depth would open new horizons and expand opportunities for new insights and innovations on avenues to harness alternative finance to meet credit needs of SMEs. This study concentrated on only three variables as it was not possible to study all possible SME characteristics. Additional/other characteristics could come into the interplay and provide perspective results to the issue of AF influ-

encing the relationship between SME characteristics and efficiency of small and medium-sized firms in Kenya.

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APPENDICES

APPENDIX 1: INTRODUCTION LETTER



FROM: Dean School of Business
TO: WHOEVER IT MAY CONCERN

Date: 01st April, 2016

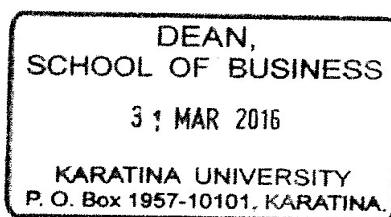
RE: WAWERU JACKSON NJAU (B300/2363/13)

The above named is a bona fide student of Karatina University taking PhD in Business Management. Mr. Waweru has completed his course work and successfully defended his proposal. He is expected to collect data for the proposed research titled "The influence of Alternative Finance and conduct on the Relationship between Characteristics and Efficiency of Small and Medium Enterprises in Kenya".

Kindly accord him any necessary assistance.

Yours Sincerely,


Prof. Irura Ng'ang'a
Dean, School Business



APPENDIX 2: RESEARCH AUTHORIZATION LETTER



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: cg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No.
NACOSTI/P/16/7063/10624

Date:

4th May, 2016

Jackson Njau Waweru
Karatina University
P.O. Box 1957-10101
KARATINA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*The influence of alternative finance and conduct on the relationship between characteristics and efficiency of Small and Medium Enterprises in Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Embu, Kericho, Kiambu, Kisumu, Machakos, Mombasa, Murang'a, Nairobi and Nakuru Counties** for the period ending **29th April, 2017.**

You are advised to report to **the County Commissioners and the County Directors of Education of the selected Counties** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

A handwritten signature in black ink, appearing to read "DR. STEPHEN K. KIBIRU".

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioners
Selected Counties.

The County Directors of Education
Selected Counties.

APPENDIX 3: QUESTIONNAIRE

QUESTIONNAIRE FOR TOP MANAGEMENT

This questionnaire is aimed at collecting data on “**Influence of alternative financing on the relationship between operational characteristics and efficiency of small and medium enterprises in Kenya**” for a PhD thesis. You are requested to participate in the study by providing answers to the items in the sections as indicated.

INSTRUCTIONS : Kindly fill your response in the space provided or tick (✓) as appropriate. All information provided is for research purposes **ONLY**, not to be disclosed to any other party.

PART A - GENERAL

1 Name of organization

2 What sub-sector does the business operate in? Please tick (✓)

Building, mining & construction	Chemical & allied	Energy, electrical & electronics
Food & beverage	Fresh produce	Leather & footwear
Metal and allied	Paper & board	Plastics & rubber
Motor vehicle & accessories	Textile & apparel	Timber, wood &furniture
Services & consultancy	Pharmaceutical & medical equipment	

3 What type of products does your organization trade in?.....

4 Gender of the respondent: Male Female

5 What is your age bracket in years? 18-30 31-50 Above 50

6(i) How has your business benefited from being a member of Kenya Association of Manufacturers (**KAM**) or a similar body?

	Statement	No, not	To a small extent	Moderately	To a big extent	Tremendously
a	Financial and managerial training	<input type="checkbox"/>				
b	Policy formulation advocacy	<input type="checkbox"/>				
c	Accessing market information	<input type="checkbox"/>				
d	Product quality improvement	<input type="checkbox"/>				
e	Accessing alternative financing loans	<input type="checkbox"/>				
f	Expanding business net-works	<input type="checkbox"/>				

6(ii) Any other benefits? Please explain in your own words.

7	Do you consider the following factors when making choice among various options of alternative finance?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a)	Cost of formal debt in relation to that of informal debt	<input type="checkbox"/>	<input type="checkbox"/>
b)	Cost of information on Availability of loanable funds	<input type="checkbox"/>	<input type="checkbox"/>
c)	Cost of audited financial statements and projections	<input type="checkbox"/>	<input type="checkbox"/>
d)	Strength of social networks	<input type="checkbox"/>	<input type="checkbox"/>

e)	Strength of official networks		
f)	Relationship between lender and business owners		
g)	Risk of take-over by lender		
h)	Risk of losing confidentiality		
i)	Time taken to process and avail funds		

8	i. Are you aware of the following alternative sources of finance? (finance Modes)			ii. To what extent has your firm relied on each mode as a source of financing in the last 5 years?				iii. Indicate the total amount received for each class in 2016? (KSH)	iv. What was the total interest paid in 2016? (KSH)
				Never	To a small extent	Moderately	Above average		
Financing Mode	YES	NO							
a) Personal savings	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
b) Loan from family	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
c) Retained earnings	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
d) Microfinance institutions	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
e) SACCOs	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
f) Table banking	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
g) Hire purchase	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
h) Lease finance	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
i) Promissory notes	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
j) Bills of exchange	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
k) Trade credit	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
l) Invoice trading	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
m) Accruals & Debt based securities	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
n) Factoring	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
o) Venture capital	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
p) Business angel financing	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
q) Peer-to-peer business lending	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
r) Peer-to-peer consumer lending	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

8(v) Which is the business's main **alternative finance mode** from the options in list (8i) above?

(Why?.....
.....

9	What are the common sources of information on available alternative finance modes pursued by firms?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
a)	Experience	<input type="checkbox"/>	<input type="checkbox"/>
b)	Family and Friends	<input type="checkbox"/>	<input type="checkbox"/>
c)	Marketing agents	<input type="checkbox"/>	<input type="checkbox"/>
d)	Media	<input type="checkbox"/>	<input type="checkbox"/>
e)	Professional affiliates	<input type="checkbox"/>	<input type="checkbox"/>
f)	Professional training	<input type="checkbox"/>	<input type="checkbox"/>
g)	Trade associations and advocacy bodies	<input type="checkbox"/>	<input type="checkbox"/>
h)	Others? Explain.	<input type="checkbox"/>	<input type="checkbox"/>

PART B – FIRM CHARACTERISTICS

I) Firm Size

- 1 How many employees do you have?
 2 How many board members does your organisation have?
 3 Type of organisation: Sole proprietorship Partnership Company limited

II) Firm Age

- 1 Which Year was the organization established?

III) Managerial Proficiency

1. Education and experience

Board member or (and)	(i) Highest Level of Education:					(ii) Experience as Board Member.				
	Mas- ter's	First de-	Diplo- plo-	High schoo	Pri- mary	10 year	6 year	3 year	1 year	Be- low
a) Any three board members: Use [√] one row per person.										
Member (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Member (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Any three top managers: Use [√] one row per person.										
Manager (a)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manager (b)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manager (c)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2 For your Enterprise, indicate the number of:	2012	2013	2014	2015	2016
New Product lines	<input type="checkbox"/>				
New Branches	<input type="checkbox"/>				

PART C – ALTERNATIVE FINANCE

I) Cost

1. Please indicate your opinion on each of the following statements regarding cost of informal/alternative sources of finance.		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Statement		<input type="checkbox"/>				
a	Alternative sources cost of financing is fairly consistent over time	<input type="checkbox"/>				
b	Alternative sources cost of financing is favourable most of the time	<input type="checkbox"/>				
c	Alternative sources cost of financing has no hidden cost	<input type="checkbox"/>				
d	Alternative finance is the preferred mode of financing compared to formal finance such as bank loan	<input type="checkbox"/>				
e	Alternative sources of finance minimize overall cost of finance	<input type="checkbox"/>				
g	Alternative sources cost of compliance is manageable	<input type="checkbox"/>				
h	Choice of mode of informal financing is influenced mainly by cost	<input type="checkbox"/>				

2	Please indicate your opinion on each of the following statements regarding cost of informal sources of finance.	Least Favourable	Unfavourable	Neutral	Favourable	Most Favourable
Statement		<input type="checkbox"/>				
a)	Processing Costs	<input type="checkbox"/>				
b)	Customer service	<input type="checkbox"/>				
c)	Availability	<input type="checkbox"/>				
d)	Speed of processing	<input type="checkbox"/>				
e)	Timeliness	<input type="checkbox"/>				

II) Culture and social demographics

1 What is your opinion on these statements on **cultural and social demographics**?

	Statement	YES	NO
a)	Culture encourages sourcing finance from alternative sources	<input type="checkbox"/>	<input type="checkbox"/>
b)	Ethnicity/ Cultural ties/ societal ties/Racial/Values/norms influences choice of alternative finance mode	<input type="checkbox"/>	<input type="checkbox"/>
c)	Family businesses mostly prefer capital from alternative sources of finance	<input type="checkbox"/>	<input type="checkbox"/>
d)	Owner characteristics such as age, gender, education, profession, experience influences choice of alternative finance mode	<input type="checkbox"/>	<input type="checkbox"/>
e)	My religion encourages us to outsource capital from alternative sources	<input type="checkbox"/>	<input type="checkbox"/>
f)	Strength of social networks of investors influences choice of alternative finance mode	<input type="checkbox"/>	<input type="checkbox"/>
g)	Women are more likely to outsource finance from alternative sources than men	<input type="checkbox"/>	<input type="checkbox"/>

2 In your opinion, how can a society use its cultural backgrounds to enhance economic welfare?

.....

3 Do you think cultural diversity contributes to economic growth?

YES

NO

Please explain your opinion

.....

.....

YES

NO

4 Do you consider religion a factor in consolidating alternative finances?

Please explain your opinion

.....

5 Please respond to the following statements as appropriate

No	Statement	YES	NO
a)	I belong to a SACCO	<input type="checkbox"/>	<input type="checkbox"/>
b)	Most of my family members belong to a SACCO	<input type="checkbox"/>	<input type="checkbox"/>
c)	We discuss alternative sources of finance in our social gatherings	<input type="checkbox"/>	<input type="checkbox"/>
d)	We charge no interest on financial support given to family members	<input type="checkbox"/>	<input type="checkbox"/>
e)	We charge no interest for any financial support to friends	<input type="checkbox"/>	<input type="checkbox"/>

III) Risk Propensity

1	Please indicate your opinion on the following statements on innovation and risk .	YES	NO
	Statement	YES	NO
a	Our business participates in profitable ventures even if risky	<input type="checkbox"/>	<input type="checkbox"/>
b	Our business acts as a market leader as opposed to reacting to competitor's actions	<input type="checkbox"/>	<input type="checkbox"/>
c	Our business has invested in research and development for improving innovation	<input type="checkbox"/>	<input type="checkbox"/>
d	Our business invests in current technology and establishes strategic alliances	<input type="checkbox"/>	<input type="checkbox"/>
e	The business takes insurance cover for directors/top management	<input type="checkbox"/>	<input type="checkbox"/>

PART D - EFFICIENCY

1 Using the factors given, how has your business improved in the last 5 years on a scale of 0 to 10? (0 means no improvement at all and 10 means exceptionally high improvement)

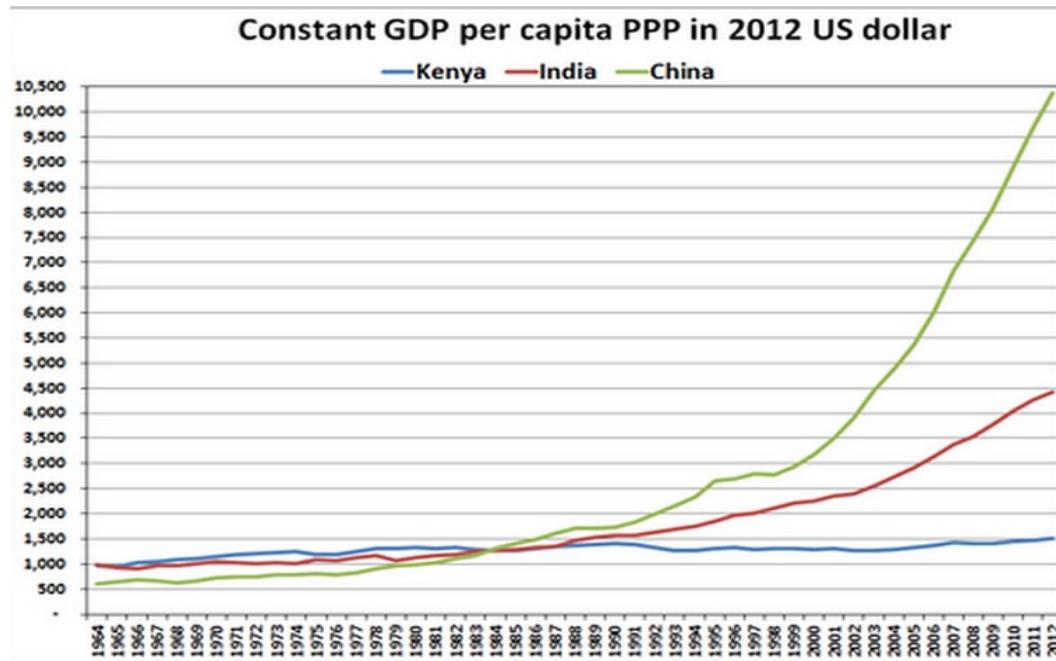
FACTOR	SCORE	0	1	2	3	4	5	6	7	8	9	10
Gross profit		<input type="checkbox"/>										
Sales turnover		<input type="checkbox"/>										
Returns on investment		<input type="checkbox"/>										
Dividends		<input type="checkbox"/>										
Retained earnings		<input type="checkbox"/>										
Total assets		<input type="checkbox"/>										
Reduction in finance costs		<input type="checkbox"/>										
Reduction in cost of sales		<input type="checkbox"/>										
Reduction in labour costs		<input type="checkbox"/>										
Reduction of operating expenses		<input type="checkbox"/>										

2 Kindly provide the following information relating to your organization:

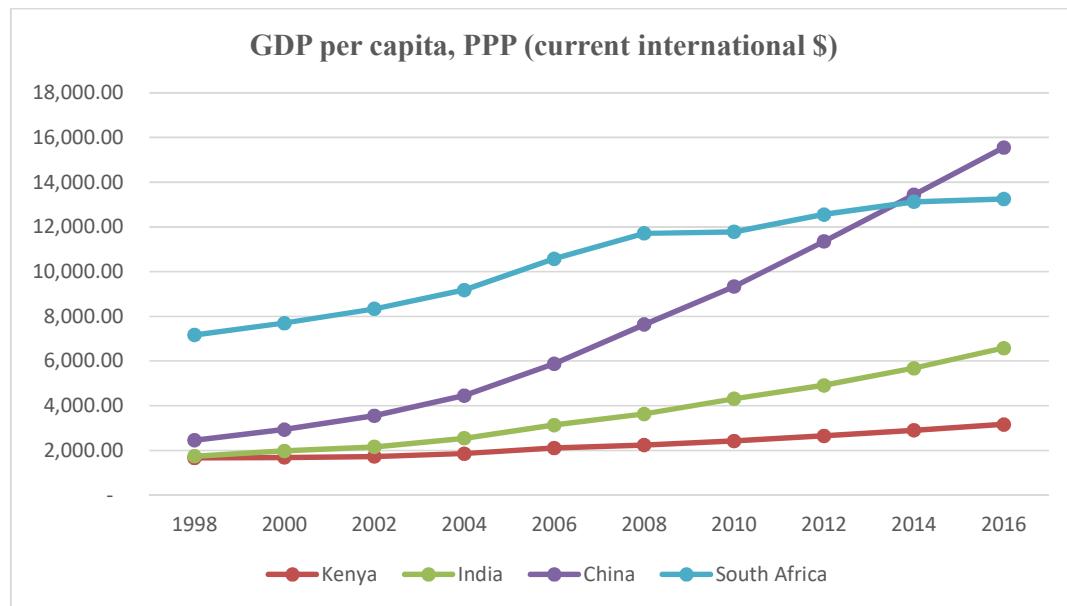
NO	ITEM	2012 (Ksh)	2013 (Ksh)	2014 (Ksh)	2015 (Ksh)	2016 (Ksh)
1	Turnover					
2	Production costs					
3	Labour costs					
4	Gross profit					
5	Operating expenses					
6	Finance costs					
7	Profit After Tax					
8	Total assets (KSh)					
9	Bank balance					
10	Receivables & Prepayments					
11	Retained Earnings					
12	Loans					
13	Payables & Accruals					
14	Other Alternative Finance					
15	ROI (%ge)					
16	Dividends (%ge)					

Thank you very much

APPENDIX 4: Kenya Economic Performance 1964 to 2012



APPENDIX 4(b): Kenya Economic Performance GDP Per Capita, PPP (Current International) 1997 to 2016



APPENDIX 5: Classification of SMEs in Kenya

MANUFACTURING AND SERVICES SME CATEGORIZATION								
CATEGORY	TURNOVER OR BALANCE SHEET TOTAL (MILLION SHILLINGS)				HEAD COUNT (PEOPLE)			
	MANUFACTURING		SERVICES		MANUFACTURING		SERVICES	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Micro	0	>10	0	>5	1	49	1	4
Small	10	>50	5	>20	50	99	4	19
Medium	50	>100	20	<20	100	249	20	<20

Source: KAM, 2015

APPENDIX 6: Philosophical Perspectives

Aspect	Positivism	Phenomenology/Interpretivism
Beliefs	Science is value free	Science is influenced by human interests
	Researcher is independent	Researcher is part of what is being studied
	Objective measures to be used for researching social reality	Researcher may introduce bias in measuring reality
	Single external reality	No single external reality
Research objectives	Empirical testing of theories	Understanding actions of human
	Focus on generalization and abstraction	Focus on specific and concrete issue
	Concentrates on description and explanation	Concentrates on understanding and interpretation
Research methods	Sample surveys	Case study
	Use questionnaires	Observations interviews
	Use statistical models for analysis	Use non-quantitative data analysis techniques
Researchers role	Detached external observer	Researcher want to experience what they are studying
	Clear distinction between reason and feeling	Allows feelings and reason to govern actions
	Uses rational consistent logic	Uses rational consistent logical ap-

	cal approach	proach
	Distinguishes between the research and personal experience	Accepts influence from both personal and scientific experience
Respondents role	Provide information required by the researcher	Explain their experiences and concepts of the world

(Source: Adapted from Mwangi 2014, Easterby-Smith, Thorpe, & Lowe, (2002); Silverman, 2002; and Carson et al., 2001).

APPENDIX 7: List of Sampled SMEs

List of Sampled SMEs			
N o	Firm Name	N o	Firm Name
1	ADAFRIC LTD	38	DANONE BABY NUTRITION
2	AFRICOTE LTD	39	DARSHAN PLASTIC LTD
3	AGRI PRO PACK LTD	40	EASY CLEAN AFRICA
4	AGRI & VET SUPPLIES LTD	41	ELBURGIT ENTERPRISES LTD
5	AGRINER LIMITED	42	ELDORET FARM MACHINERY
6	ALAMDAR TRADING CO	43	ELEX PRODUCTS EA LTD
7	ALLIANCE TOBACCO LTD	44	EMANA AFRICA LTD
8	ALLIED EAST AFRICA LTD	45	EMOMENTUM SYSTEM LTD
9	ALPHA MEDICAL SUPPLIERS	46	ESSENTIAL MANUF. LTD
10	ANDEST BITES	47	FANTEX LTD
11	ANFFI KENYA LTD	48	FINE WOOD WORKS LIMITED
12	ANIMAL FEED LTD	49	FIVE STAR INDUSTRIES LTD
13	ANVI EMPORIUM LTD	50	FORTUNES PRINTERS LTD
14	ATLANTIC LIMITED	51	FUTURE GARMENTS LTD
15	AVOKEN LTD	52	GALAXY CO. LTD
16	BELAT ENTERPRISES	53	GANGLONG COMPANY
17	BENMED PHARM LTD	54	GLOBAL FRESH LTD
18	BIOGAS LTD	55	GONE FISHING LTD
19	BIPHARM LTD	56	GREEN FOREST FOOD LTD
20	BLUE SKY INDUSTRIES	57	GSI KENYA LTD
21	BLUEKEY SOLUTIONS LTD	58	HALLIDAY FINCH LTD
22	BRAND PRINTERS	59	HANTEX GARMENTS LTD
23	BRILLIANT GARMENTS	60	HAPPY COW LTD
24	BUNDA CAKES & FEEDS	61	HTM CAPITAL
25	C CZARNIKOW SUGAR EA LTD	62	IKAPAMEDIA EA LIMITED
26	CAFFE DEL LUCA LTD	63	INDUSTRIAL & SCIENTIFIC
27	CANAANEAST CO LTD	64	INDUSTRIAL SERVICES
28	CAPWELL INDUSTRIES LTD	65	INSTITUTE OF PACKAGING
29	CARTUBOX E. A. LTD	66	SUPPLY CHAIN SOLUTIONS
30	CENTURION SYSTEMS	67	INTERSOFT LIMITED
31	CHUI AUTO LTD	68	INTERTEX INTERN. LTD
32	CITYSCAPE TRENDS LTD	69	JASHO FEEDS STORES
33	COFFEE AGRIWORKS LTD	70	OCCUPATIONAL HEALTH
34	COFFTEE AGENCIES	71	JUMBO FEEDS LIMITED
35	COMFORT CHILDREN	72	JUMBO MATRESS LTD
36	COMHARD LTD	73	JUMBO QUALITY PRODUCTS
37	CRYSTAL INDUSTRIES LTD	74	KAIZEN INSTITUTE AFRICA

List of Sampled SMEs Continued

No	Firm Name	No	Firm Name
75	KAM INDUSTRIES	112	OSS. CHEMIE K
76	KAMBU DISTILLERS LIMITED	113	PALMY ENTERPRISES
77	KAPRIC APPARELS	114	PANAL FREIGHTERS
78	KARAN BIO FUELS	115	PENNY GALORE LTD
79	KAVIROND FILMENTS LTD	116	PENTAGON AGENCIES
80	KEMU PACKERS LTD	117	PHARM ACCESS LTD
81	KENLAB SUPPLIES	118	PRIDE INDUSTRIES
82	KENRUB LTD	119	PRINTING SERVICES LTD
83	KENYA FIRE APPS LTD	120	PRISTINE LTD
84	KENYA NATIONAL CLEANER	121	PROSEL LTD
85	KERIO VALLEY DEV	122	PROTEL STUDIOS
86	KIKOY MALL LTD	123	REVOLUTION STORES LTD
87	KOBA WATERS LTD	124	RIVATEX LTD
88	KRIDHA LTD	125	ROKA INDUSTRIES
89	KRISH COMMODITIES LTD	126	RUMORTH EA. LTD
90	KUGURU FOOD LTD	127	RUPA MILLS
91	KURAWA INDUSTRIES	128	SAFECHEM K LTD
92	LAKHIA PLASTICS	129	SANDSTORM AFRICA LTD
93	LIFEWORKS SHUKRANI LTD	130	SANERGY LTD
94	MACHINERY & EQUIP	131	SERVICE SHOES AFRICA LTD
95	MAMA MILLERS LTD	132	SEWECO PAINTS LTD
96	MARVEL LIFESTYLE LTD	133	SHAMCO INDUSTRIES
97	METOXIDE AFRICA LTD	134	SHINE ACE GARMENTS
98	MFI ULTRA PAINT LTD	135	SHIV ENTERPRISES
99	MILLENIUM MANAGEMENT	136	SHREEJI CHEMICALS LTD
100	MODULEC ENGINEERING LTD	137	SIYA INDUSTRIES K LTD
101	MOMBASA APPAREL EPZ LTD	138	SOCABELEC EA LTD
102	MORANI LTD	139	SOHANSONS LTD
103	MOTORBIKE AFRICA LTD	140	SOKO EXPORT PROCESSING
104	MUNYIRI HONEY LTD	141	SOLIMPEXS AFRICA LIMITED
105	NAUSHAD TRADING CO	142	SONGYI MOTOCYCLES LTD
106	NDUME LTD	143	SPECTRUM NETWORK LTD
107	NESFOOD INDUSTRIES LTD	144	SPERKJET E.A LTD
108	NEWPORT LTD	145	SPROXIL EA LIMITED
109	NORTHSTAR PACKAGING LTD	146	STRATEGIC VALUE LTD
110	NORTHWEST K LTD	147	SUMMIT ENERGY SYSTEMS
111	OPTIMUM LUBRICANT LTD	148	SWEET RUS LTD

List of Sampled SMEs Continued

Firm Name	No	Firm Name
149 SYMBIOTIC MEDIA	161	VECTUS KENYA LTD
150 SYNERGY-PRO	162	VICENSA INVESTMENT
151 TECHNOCONSTRUCT KENYA	163	VIKING INDUSTRIES LTD
152 THEEVAN ENTERPRISES LTD	164	VINE PACK LTD
153 TIMBER TREAT INTER LTD	165	VIRTUAL CITY
154 TOP PAK LIMITED	166	VISCAR CAPACITY LTD
155 TRUST FEEDS LTD	167	WARIDI CREATIONS LTD
156 TRUST FLOUR MILLS LTD	168	WEST MINISTER
157 TULIPS COLLECTION LIMITED	169	WILDLIFE WORKS LTD
158 TURACO LTD	170	WORLD OF KIKOYS
159 VAKHARIA MILLS	171	WOTECH KENYA LTD
160 VALLEM LTD		

APPENDIX 8: Pilot Run Results

No	Test	Tool	Highest	Lowest	Threshold	Conclusion
1	Reliability	Cronbach Alpha	.905	.697	0.70	Acceptable.
2	Construct	Factor Analysis –				
	Validity	KMO	0.752		0.5	Accept
		Bartlett's Test	.002		0.05	Significant
3	Reliability	Test – Retest	0.845	-.321	0.05	Q 21 Not significant
4	Efficiency	DEA	1	0	$\leq 0 \geq 1$	Normal
		Mean	0.4750			Accept
		Skewness	0.360			
5	Model	R ²	0.030		Closer to 1	+Relationship
		Coefficient			the better	Increase sample
		Age	0.003		0.05	Remove outliers
		Size	0.031		0.05	
		Competency	0.039		0.05	
6	Heteroscedas- ticity (H ^S)	Breusch -Pagan Koenker	0.957 0.855		Sig $\geq .05$ Sig $\geq .05$	H ^S absent thus good
	Multicollin- earity (M ^C)	VIF Tolerance	1.194 .979	1.021 .839	≤ 3 . The closer to 1, the better.	M ^C Absent Strong
7	Normality	Shapiro - Wilk	.593	000	Sig $\geq .05$	Distribution of age not normal

APPENDIX 9: DEA Inputs and Outputs Statistics

No	Variable	N	Mean	Std. Deviation	Skewness	Kurtosis	Minimum	Maximum
1	Alternative Finance (AF)	136	141.56	101.75	0.95	0.25	17.86	526.52
2	Bank balance	136	4.32	2.42	0.57	-1.07	1.44	9.93
3	Dividends (%)	136	19.78	10.07	1.07	2.47	0.00	63.00
4	Education (Yrs.)	136	3.99	0.93	-0.15	-1.50	2.00	5.00
5	Efficiency	136	0.92	0.18	-1.15	1.72	0.12	1.00
6	Employees (No.)	136	54.00	32.00	2.00	10.00	7.00	245.00
7	Experience (Yrs.)	136	3.92	0.96	-0.04	-1.54	2.00	5.00
8	Finance costs (M Ksh.)	136	1.88	1.02	0.45	-1.31	0.66	4.20
9	Firm Age (Years)	136	19.09	18.60	2.81	9.71	2.00	119.00
10	Gross Profit	136	27.29	12.63	0.75	0.24	8.38	69.87
11	Gross profit margin (%)	136	42.32	1.86	0.24	-0.42	37.77	47.04
12	Innovation (No.)	136	1.77	0.44	0.00	0.22	0.40	2.90
13	Loans	136	35.55	19.21	0.51	-1.15	13.10	83.04
14	Operating expenses (M Ksh.)	136	11.36	7.81	2.01	5.59	4.00	45.38
15	Other Alternative Finance	136	9.35	5.31	0.71	-0.80	2.71	22.69
16	Payables Accruals	136	4.73	2.64	0.58	-0.98	1.66	11.87
17	Production costs (M Ksh.)	136	24.71	15.51	1.23	1.64	4.60	88.02
18	Profit After Tax	136	9.83	8.31	1.33	1.73	-0.22	43.79
19	Receivables prepayments	136	6.60	3.53	0.42	-1.40	2.47	14.30
20	Retained Earnings	136	129.60	101.80	0.95	0.27	5.17	518.86
21	ROI	136	9.90	3.75	-0.20	0.94	-0.76	20.75
22	Staff costs (M Ksh.)	136	12.38	6.52	0.37	-1.52	5.30	25.40
23	Total Assets	136	140.51	101.53	0.94	0.23	21.88	524.81
24	Total Assets Log (SI Log)	136	8.03	0.33	0.01	-1.11	7.34	8.72
25	Turnover (M, Ksh)	136	64.39	29.53	0.78	0.36	19.14	165.21

Sourse: Research data

APPENDIX 10: Efficiency - DEA Inputs & Outputs Descriptive Statistics

Table

(a) Production Costs

No.	Class	Frequency	Percentage
1	Up to 12	26.00	19.12
2	Over 12, Up to 24	54.00	39.71
3	Over 24, Up to 36	22.00	16.18
4	Over 36, Up to 48	24.00	17.65
5	Over 48, Up to 60	5.00	3.68
6	Over 60, Up to 72	4.00	2.94
7	Over 72, Up to 84	-	-
8	Over 84	1.00	0.74
N		136	100.00

**n = 136; **Number of classes 8; SE=0.05

Table (b) Staff Costs

No.	Class	Frequency	Percentage
1	Up to 7.5	66	48.53
2	Over 7.5, Up to 10	6	4.41
3	Over 10, Up to 12.5	1	0.74
4	Over 12.5, Up to 15	4	2.94
5	Over 15, Up to 17.5	13	9.56
6	Over 17.5, Up to 20	25	18.38
7	Over 20, Up to 22.5	11	8.09
8	Over 22.5	10	7.35
N		136	100.00

Table (c) Operating Expenses

No.	Class	Frequency	Percentage
1	Up to 6	53	38.97
2	Over 6, Up to 12	20	14.71
3	Over 12, Up to 18	50	36.76
4	Over 18, Up to 24	7	5.15
5	Over 24, Up to 30	2	1.47
6	Over 30, Up to 36	0	-
7	Over 36, Up to 42	3	2.21
8	Over 42	2	1.47
	N	136	100.00

**n = 136; **Number of classes 8; SE=0.05

Table (d) Finance Costs

No.	Class	Frequency	Percentage
1	Up to 1	38	27.94
2	Over 1, Up to 1.5	34	25.00
3	Over 1.5, Up to 2	4	2.94
4	Over 2, Up to 2.5	14	10.29
5	Over 2.5, Up to 3	19	13.97
6	Over 3, Up to 3.5	14	10.29
7	Over 3.5, Up to 4	12	8.82
8	Over 4	1	0.74
	N	136	100.00

**n = 136; **Number of classes 8; SE=0.05

DEA Outputs

Table (e) Turnover

No.	Class (Mil. Kshs)	Frequency	Percentage %
1	Up to 20	1	0.74
2	Over 20, Up to 40	36	26.47
3	Over 40, Up to 60	25	18.38
4	Over 60, Up to 80	38	27.94
5	Over 80, Up to 100	19	13.97
6	Over 100, Up to 120	12	8.82
7	Over 120, Up to 140	3	2.21
8	Over 140	2	1.47
N		136	100.00

**n = 136; **Number of classes 8; SE=0.05

Table (f) Gross Profit Margin

No.	Class (%)	Frequency	Percentage
1	Up to 38	1	0.74
2	Over 38, Up to 39.3	4	2.94
3	Over 39.3, Up to 40.6	17	12.50
4	Over 40.6, Up to 41.9	40	29.41
5	Over 41.9, Up to 43.2	31	22.79
6	Over 43.2, Up to 44.5	22	16.18
7	Over 44.5, Up to 45.8	16	11.76
8	Over 45.8	5	3.68
N		136	100.00

Table (g) ROI

No.	Class (%)	Frequency	Percentage
1	Up to 1	2	1.47
2	Over 1, Up to 4	9	6.62
3	Over 4, Up to 7	14	10.29
4	Over 7, Up to 10	37	27.21
5	Over 10, Up to 13	55	40.44
6	Over 13, Up to 16	14	10.29
7	Over 16, Up to 19	2	1.47
8	Over 19	3	2.21
N		136	100.00

**n = 136; **Number of classes 8; SE=0.05

Table (h) Dividends

No.	Class (%)	Frequency (No.)	Percentage (%)
1	Up to 8	12	8.82
2	Over 8, Up to 16	40	29.41
3	Over 16, Up to 24	48	35.29
4	Over 24, Up to 32	21	15.44
5	Over 32, Up to 40	7	5.15
6	Over 40, Up to 48	6	4.41
7	Over 48, Up to 56	1	0.74
8	Over 56	1	0.74
N		136	100.00

**n = 136; **Number of classes 8; SE=0.05

Table (J) Number of Employees

No.	Class	Frequency	Percentage	Cummulative
1	Up to 31.25	31	23	23
2	Over 31.25 , Up to 62.5	53	39	62
3	Over 62.5, Up to 93.75	45	33	95
4	Over 93.75, Up to 125	5	4	99
5	Over 125, Up to 156.25	0	0	99
6	Over 156.25, Up to 187.5	0	0	99
7	Over 187.5, Up to 218.75	1	1	99
8	Over 218	1	1	100
N		136	100	

**n = 136; **Number of classes 8; SE=0.05

Table (k) Number of New Branches/Products

No.	Class	Frequency	Percentage	Cumulative
1	Up to 0.7	2	1	1
2	Over 0.7, Up to 1.0	4	3	4
3	Over 1.0, Up to 1.3	8	6	10
4	Over 1.3, Up to 1.6	40	29	40
5	Over 1.6, Up to 1.9	43	32	71
6	Over 1.9, Up to 2.2	10	7	79
7	Over 2.2, Up to 2.5	21	15	94
8	Over 2.5, Up to 2.8	7	5	99
9	Over 2.8	1	1	100
N		136	100	

**n = 136; **Number of classes 9; SE=0.05

Table (I): Education/Experience Distribution

	Frequency	Percent	Cumulative percent
Low	4	2.9	2.9
Average	30	22.1	25.0
High	48	35.3	60.3
Very high	54	39.7	100.0
Total	136	100.0	

APPENDIX 11: Descriptive Constructs Aligning Objectives to Hypotheses & Models

(i)

NO	AF MODERATION				VARIABLE	ABBREVIATION
	NULL HYPOTHESIS	ALTERNATIVE HYPOTHESIS	NULL HYPOTHESIS	ALTERNATIVE HYPOTHESIS		
1	H _{02, S}	H _{12, S}	-	-	Characteristics	S
2	H _{03, G}	H _{13, G}	-	-		G
3	H _{04, M}	H _{14, M}	-	-		M
4	H _{05, R}	H _{15, R}	-	-		R
5	H _{02, T}	H _{12, T}	H _{02, ST}	H _{12, ST}	Assets	T
6	H _{02, O}	H _{12, O}	H _{02, SO}	H _{12, SO}	Turnover	O
7	H _{02, Y}	H _{12, Y}	H _{02, SY}	H _{12, SY}	Employees	Y
8	H_{02, S}	H_{12, S}	H_{02, S}	H_{12, S}	Size	S
9	H_{03, G}	H_{13, G}	H_{03, G}	H_{13, G}	Age	G
10	H _{04, X}	H _{14, X}	H _{04, MX}	H _{14, MX}	Managerial Competencies	X
11	H _{04, U}	H _{14, U}	H _{04, MU}	H _{14, MU}		U
12	H _{04, I}	H _{14, I}	H _{04, MI}	H _{14, MI}		I
13	H_{04, M}	H_{14, M}	H_{04, M}	H_{14, M}		M
14	H_{05, R}	H_{15, R}	H_{05, R}	H_{15, R}	Grand Combination Characteristics	R

(ii)

NO	OBJECTIVE	MODEL	MODERATION			
			NULL HYPOTHESIS	ALTERNATIVE HYPOTHESIS	NULL HYPOTHESIS	ALTERNATIVE HYPOTHESIS
1	1. Evaluate the operational efficiency of SMEs	DEAP	-	-	-	-
2	5. Evaluate relationship between SME characteristics - size, age & managerial competency, and efficiency of SMEs	MLR	H _{02, S}	H _{12, S}	-	-
3		MLR	H _{03, G}	H _{13, G}	-	-
4		MLR	H _{04, M}	H _{14, M}	-	-
5	5. Combined	MLR	H_{05, R}	H_{15, R}	-	-
6	2. Evaluate moderating influence of AF on the relationship between SME size and, (assets, turnover & no of employees) efficiency	MMR	H _{02, T}	H _{12, T}	H _{02, ST}	H _{12, ST}
7		MMR	H _{02, O}	H _{12, O}	H _{02, SO}	H _{12, SO}
8		MMR	H _{02, Y}	H _{12, Y}	H _{02, SY}	H _{12, SY}
9	2 Size Combined	MMR	H_{02, S}	H_{12, S}	H_{03, S}	H_{12, S}
10	3. Evaluate moderating influence of AF on the relationship between SME characteristics (age) and efficiency	MMR	H_{03, G}	H_{13, G}	H_{03, G}	H_{13, G}
11	4. Evaluate moderating influence of AF on the relationship between SME characteristics - managerial competency (Experience, education & innovation) and efficiency	MMR	H _{04, X}	H _{14, X}	H _{04, MX}	H _{14, MX}
12		MMR	H _{04, U}	H _{14, U}	H _{04, MU}	H _{14, MU}
13		MMR	H _{04, I}	H _{14, I}	H _{04, MI}	H _{14, MI}
14	4 Managerial competencies Combined	MMR	H_{04, M}	H_{14, M}	H_{04, M}	H_{14, M}
15	5 Characteristics Combined	MMR	H_{05, R}	H_{15, R}	H_{05, R}	H_{15, R}

APPENDIX 12: Some LP SPSS Outputs

Size vs Efficiency

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.395 ^a	.156	.150	.16379

a. Predictors: (Constant), Size

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.666	1	.666	24.830	.000 ^b
	Residual	3.595	134	.027		
	Total	4.261	135			

a. Dependent Variable: Efficiency

b. Predictors: (Constant), Size

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1	(Constant)	-.806	.346	-2.331	.021
	Size	.214	.043	.395	.000

a. Dependent Variable: Efficiency

Firm Age vs Efficiency

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.354 ^a	.125	.119	.16678

a. Predictors: (Constant), Firm Age

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.534	1	.534	19.193	.000 ^b
	Residual	3.727	134	.028		
	Total	4.261	135			

a. Dependent Variable: Efficiency

b. Predictors: (Constant), Firm Age

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1	(Constant)	.851	.020	41.565	.000
	Firm Age	.003	.001	.354	4.381

a. Dependent Variable: Efficiency

Managerial Competency vs Efficiency

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.663 ^a	.439	.435		.13353

a. Predictors: (Constant), Competency

ANOVA

Model	Sum of Squares		Df	Mean Square	F	Sig.
	Regression	Residual				
1	1.872	2.389	1	1.872	104.982	.000 ^b
		Total	134	.018		
			135			

a. Dependent Variable: Efficiency

b. Predictors: (Constant), Competency

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1	(Constant)	.304	.061	4.989	.000
	Competency	.150	.015	.663	10.246

a. Dependent Variable: Efficiency

OVERALL

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.764 ^a	.584	.574		.11589

a. Predictors: (Constant), Competency, Firm Age, Size

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.488	3	.829	61.750	.000 ^b
	Residual	1.773	132	.013		
	Total	4.261	135			

a. Dependent Variable: Efficiency

b. Predictors: (Constant), Competency, Firm Age, Size

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	T
1	(Constant)	-1.031	.253		-4.074
	Firm Age	.003	.001	.316	5.346
	Size	.176	.033	.324	5.389
	Competency	.118	.014	.519	8.639

a. Dependent Variable: Efficiency

APPENDIX 13: SEM-PLS Output

Structural Equation Modelling - Partial Least Squares – SEM - PLS

Size vs Efficiency

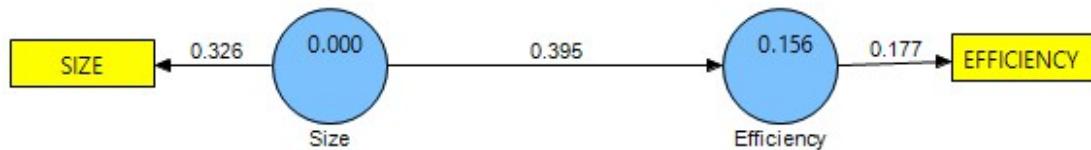


Figure 13(a): Path Coefficients for the Relationship between Size and Efficiency

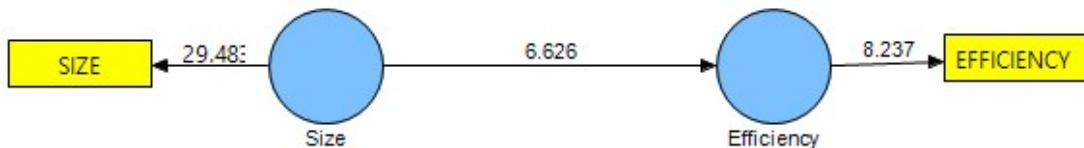


Figure 13(b): t-Values for the Relationship between Size and Efficiency

Table 13(a): Regression Weight for the Relationship between Size and Efficiency

	Beta	Standard Deviation	Standard Error	T Statistics	P values
Size -> Efficiency	0.3954	0.0597	0.0597	6.6257	0.000

Firm Age and Efficiency

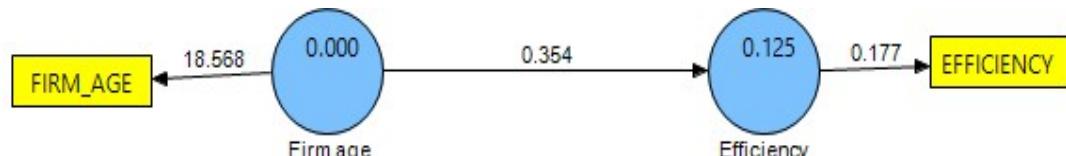


Figure 13(c): Path Coefficients for the Relationship between Firm Age and Efficiency



Figure 13(d): T-Values for the Relationship between Firm Age and Efficiency

Table 13(b): Regression Weight for the Relationship between Size and Efficiency

	Beta	Standard Deviation	Standard Error	t-Statistics	P values
Firm Age -> Efficiency	0.354	0.026	0.026	13.6121	0.000

Competency and Efficiency

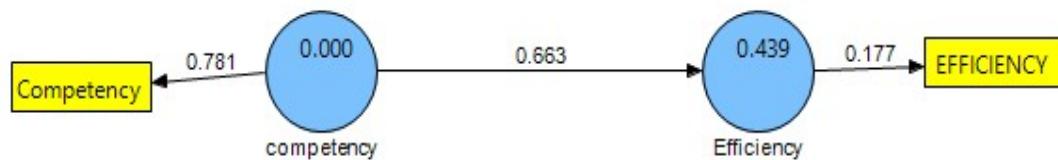


Figure 13(e): Path Coefficients for the Relationship between Competency and Efficiency

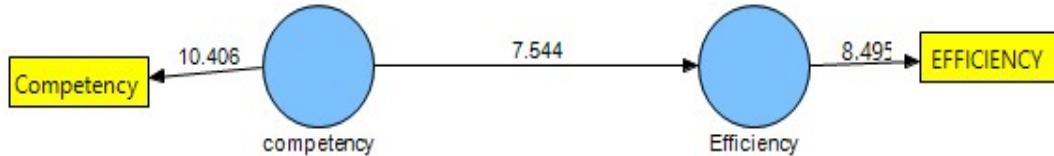


Figure 13(f): t-values for the Relationship between Competency and Efficiency

Table 13(c): Regression Weight for the Relationship between Competency and Efficiency

	Beta	Standard Deviation	Standard Error	T Statistics	P values
Competency -> Efficiency	0.6628	0.0879	0.0879	7.544	0.000

Overall Model - Characteristics Vs Efficiency

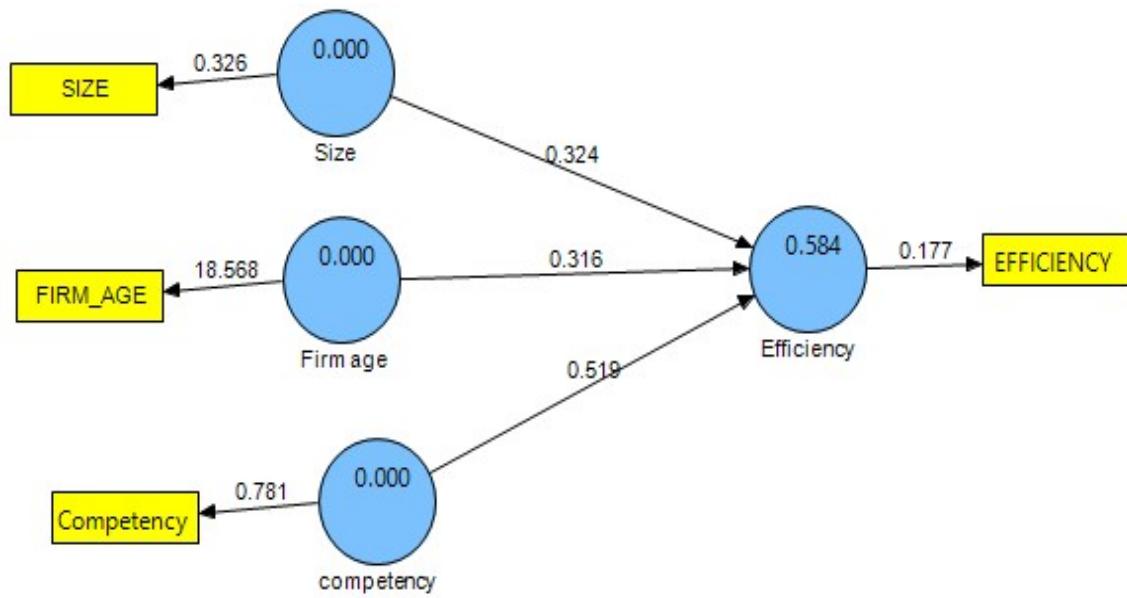


Figure 13(g): Path Coefficients for the Overall Model

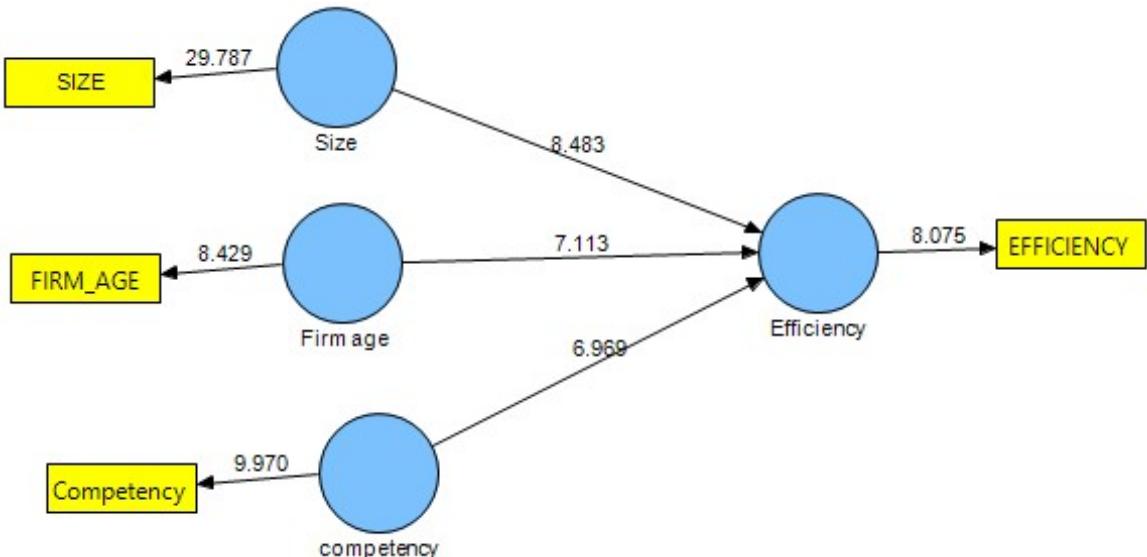


Figure 13(h): t- values for the Overall Model

Table 13(d): Regression Weight for the Overall Model

	Standard Beta	Standard Deviation	Standard Error	T Statistics	P values
Firm Age -> Efficiency	0.3164	0.0445	0.0445	7.1133	0.000
Size -> Efficiency	0.3237	0.0382	0.0382	8.4826	0.000

competency -> Efficiency	0.5189	0.0745	0.0745	6.9691	0.000
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Moderation

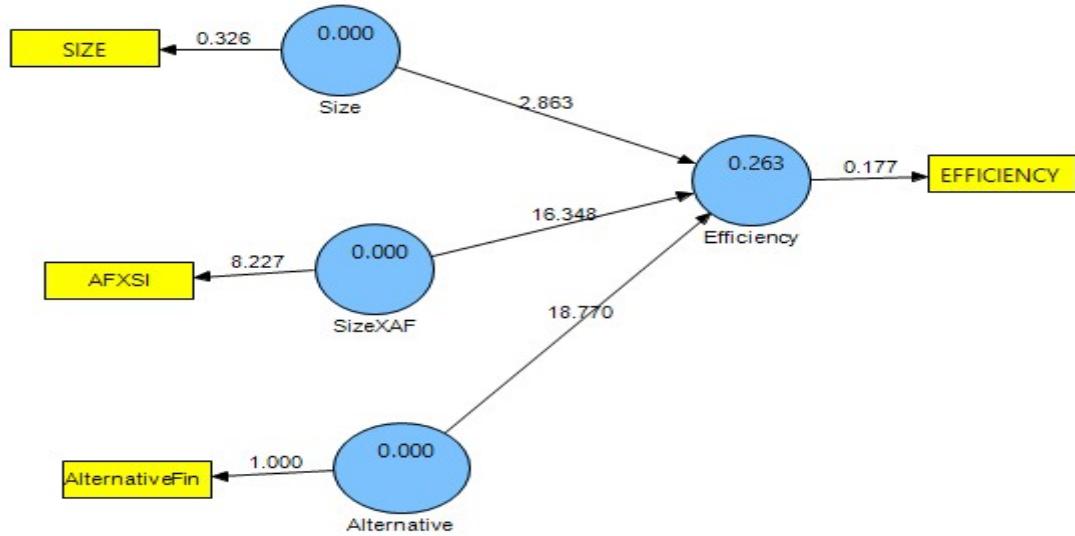


Figure 13(j): Path Coefficients for the Moderated Size

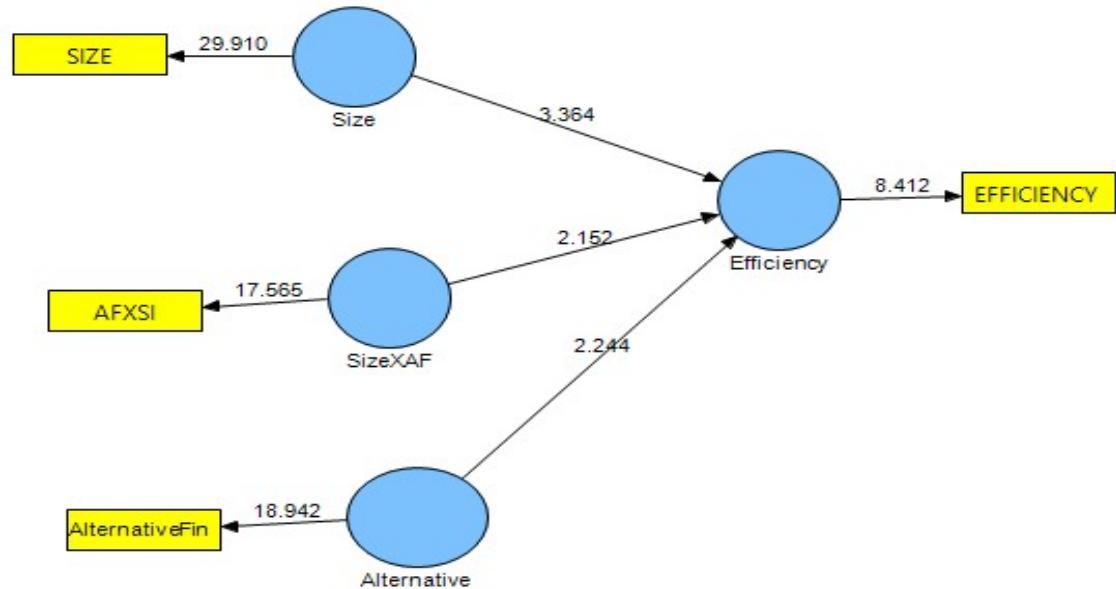


Figure 13(k): t-values for the Moderated Size

Table 13(e): Regression weight for the moderated size

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
Alternative -> Efficiency	18.7697	8.3636	8.3636	2.2442	0.026435
Size -> Efficiency	2.863	0.851	0.851	3.3642	0.000998
Size X AF -> Efficiency	16.3485	7.5957	7.5957	2.1523	0.033139

Moderated Age

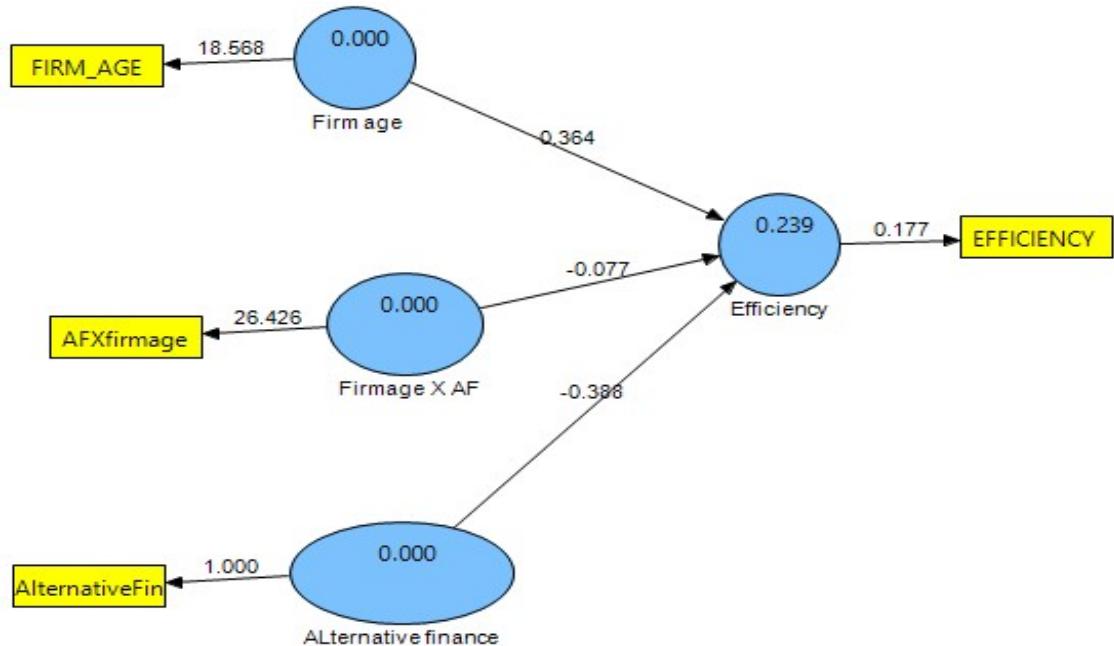


Figure 13(l): Path Coefficients for the Moderated Age

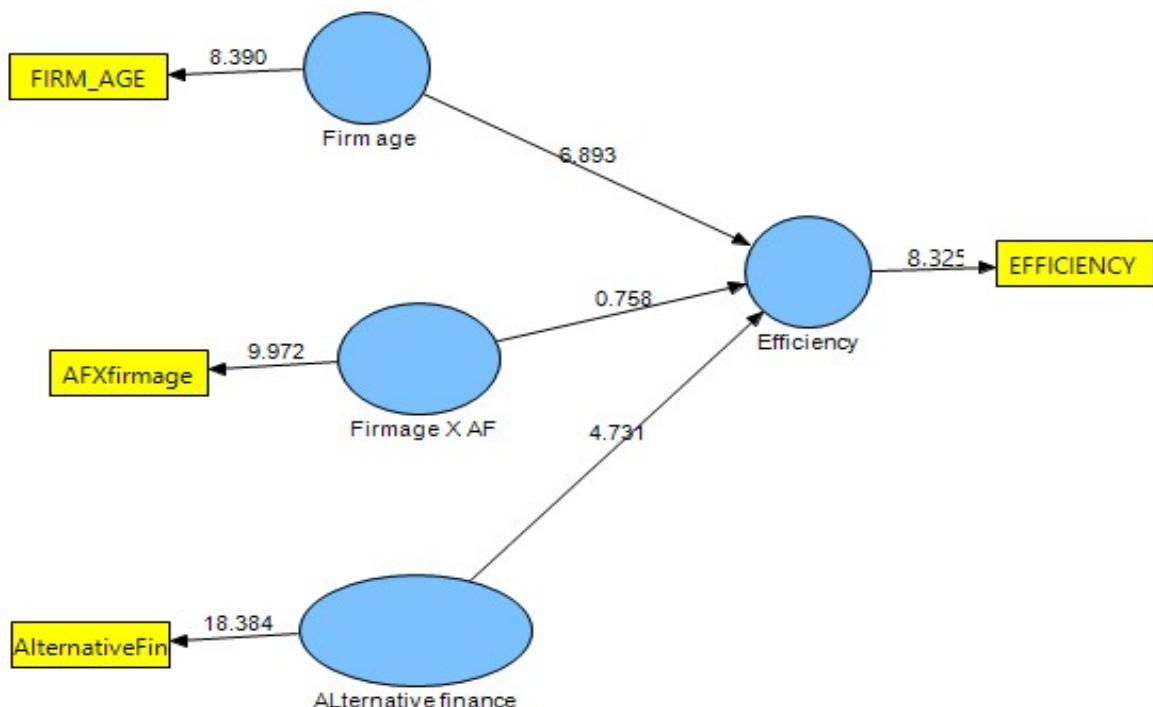


Figure 13(m): T-values for the Moderated Firm Age

Table 13(f): Regression Weight for the Moderated Age

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
Alternative finance -> Efficiency	-0.3875	0.0819	0.0819	4.7306	0.000
Firm age -> Efficiency	0.3635	0.0527	0.0527	6.8931	0.000
Firm age X AF -> Efficiency	-0.0771	0.1018	0.1018	0.7579	0.450

Moderated Competency

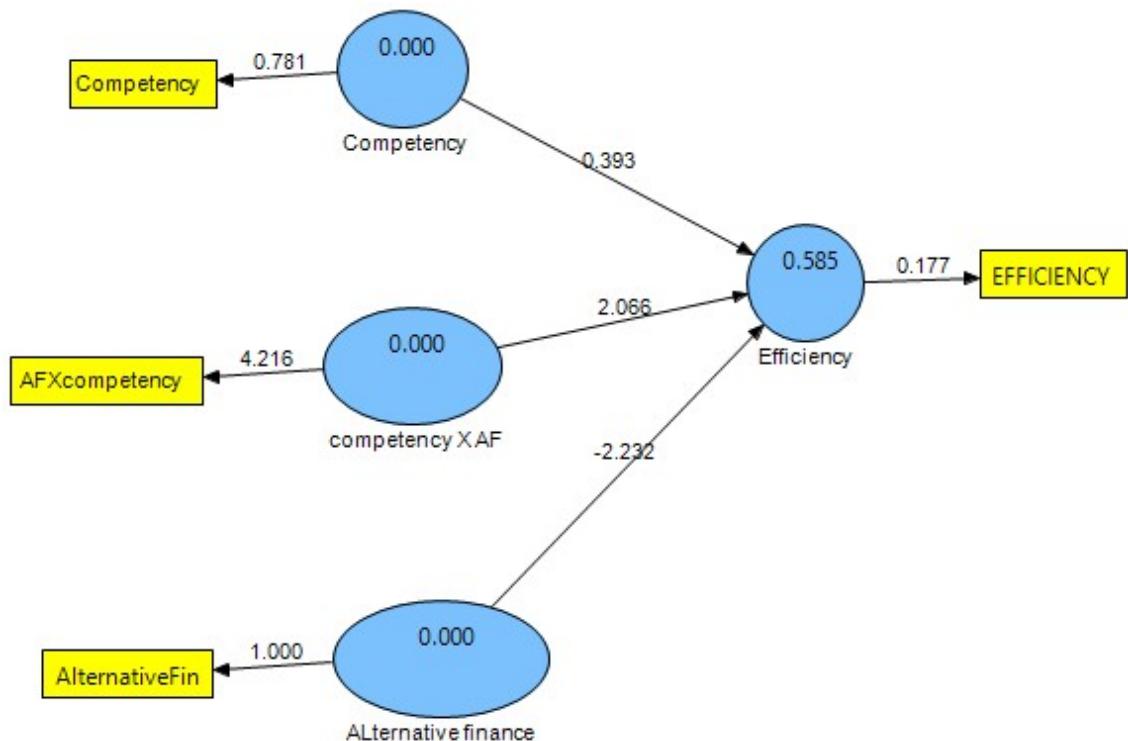


Figure 13(n): Path Coefficients for the Moderated Competency

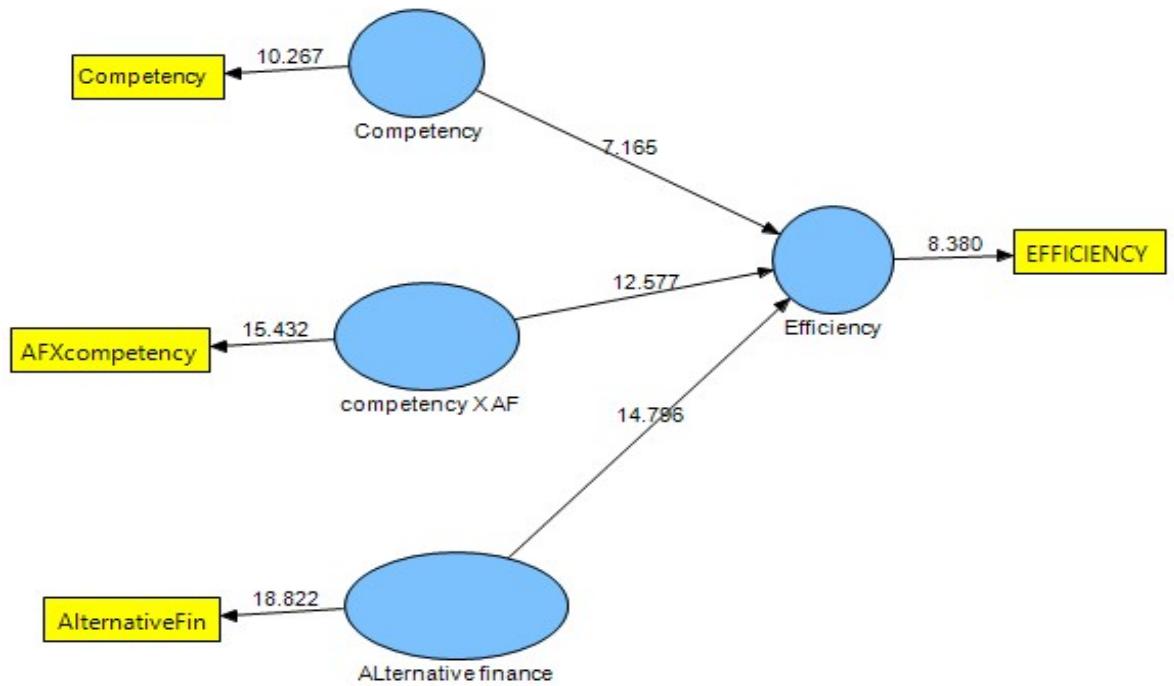


Figure 13(o): T-values for the Moderated Competency

Table 13(g): Regression Weight for the Moderated Competency

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
Alternative finance -> Efficiency	-2.232	0.1509	0.1509	14.7957	0.000
Competency -> Efficiency	0.3926	0.0548	0.0548	7.1645	0.000
competency X AF -> Efficiency	2.0664	0.1643	0.1643	12.577	0.000

Overall moderated

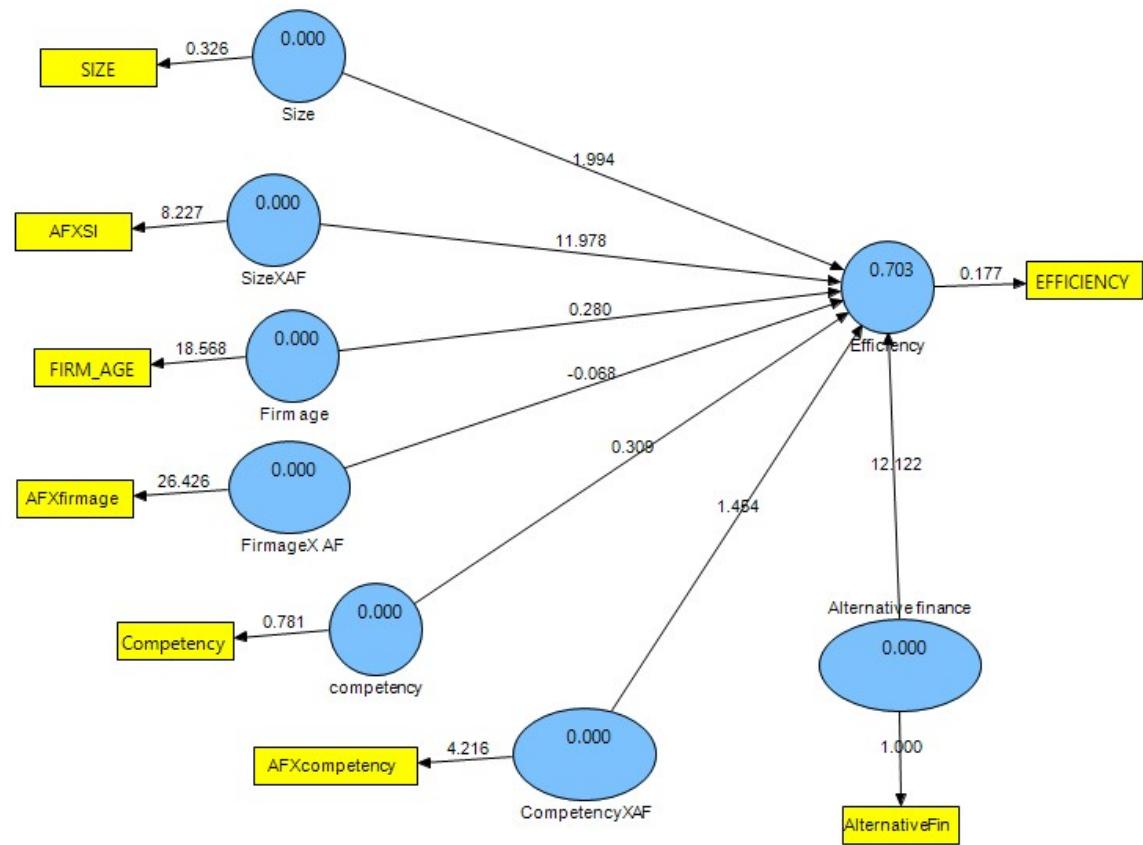


Figure 13(p): Path Coefficients for the Overall Moderated Model

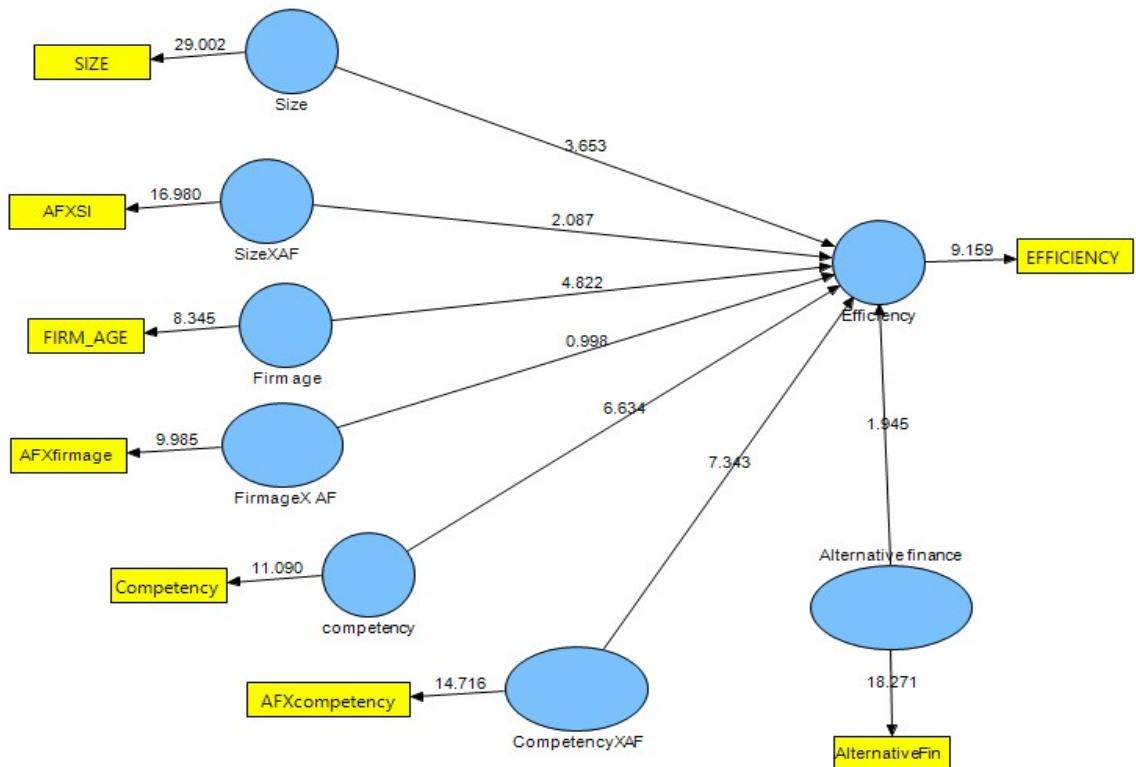


Figure 13(q): t-values for the Overall Moderated Model

Table 13(h): Regression Weight for the Overall Moderated Model

Path	Beta	Standard Deviation	Stand-ard Er-ror	T Statis-tics	P val-ues
Alternative finance -> Efficiency	12.122				
Competency X AF -> Efficiency	1.454	0.198	0.198	7.3427	0.000
Firm age -> Efficiency	0.2799	0.058	0.058	4.8223	0.000
Firm age X AF -> Efficiency	-0.0685	0.0687	0.0687	0.9975	0.320
Size -> Efficiency	1.9937	0.5458	0.5458	3.6529	0.000
Size X AF -> Efficiency	4	5.7406	5.7406	2.0866	0.039
competency -> Efficiency	0.3095	0.0466	0.0466	6.6339	0.000

Collapsed Size

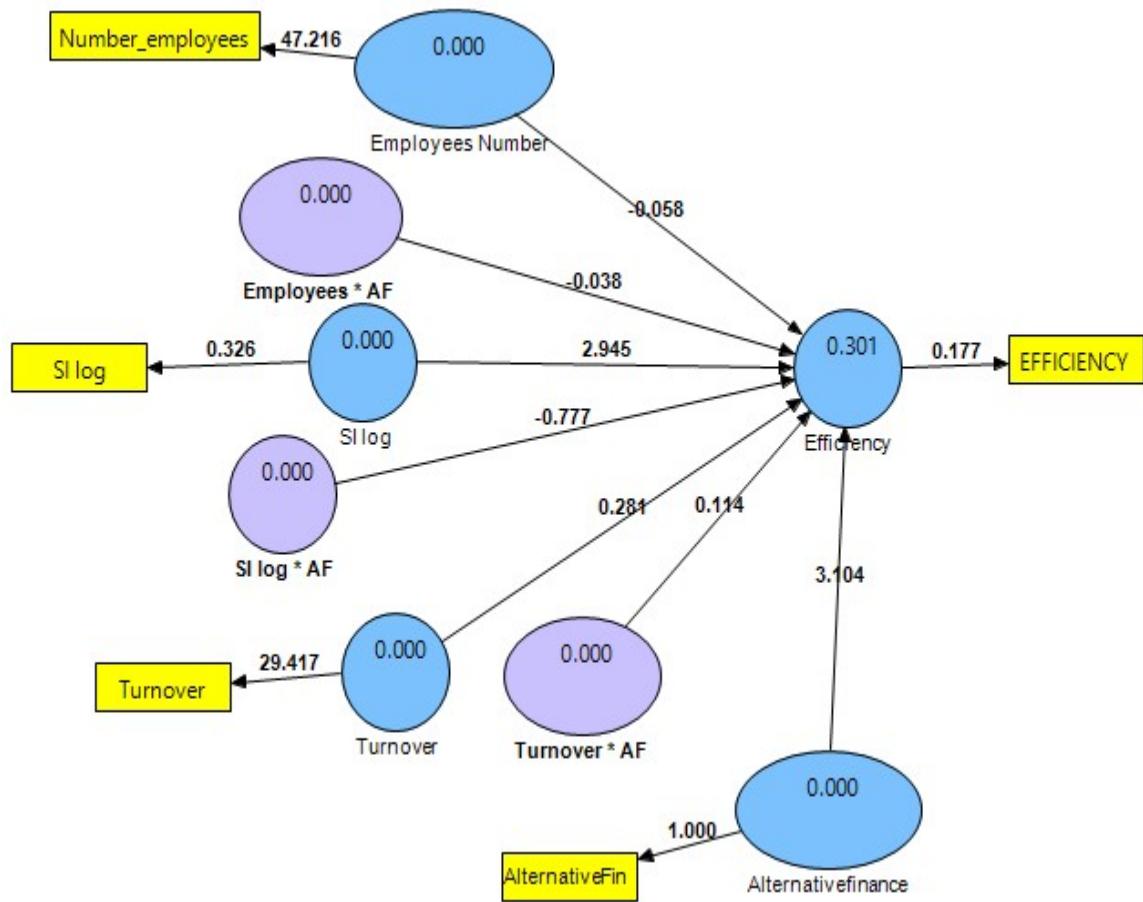


Figure 13(r): Path Coefficients for the Size Collapsed Moderated Model

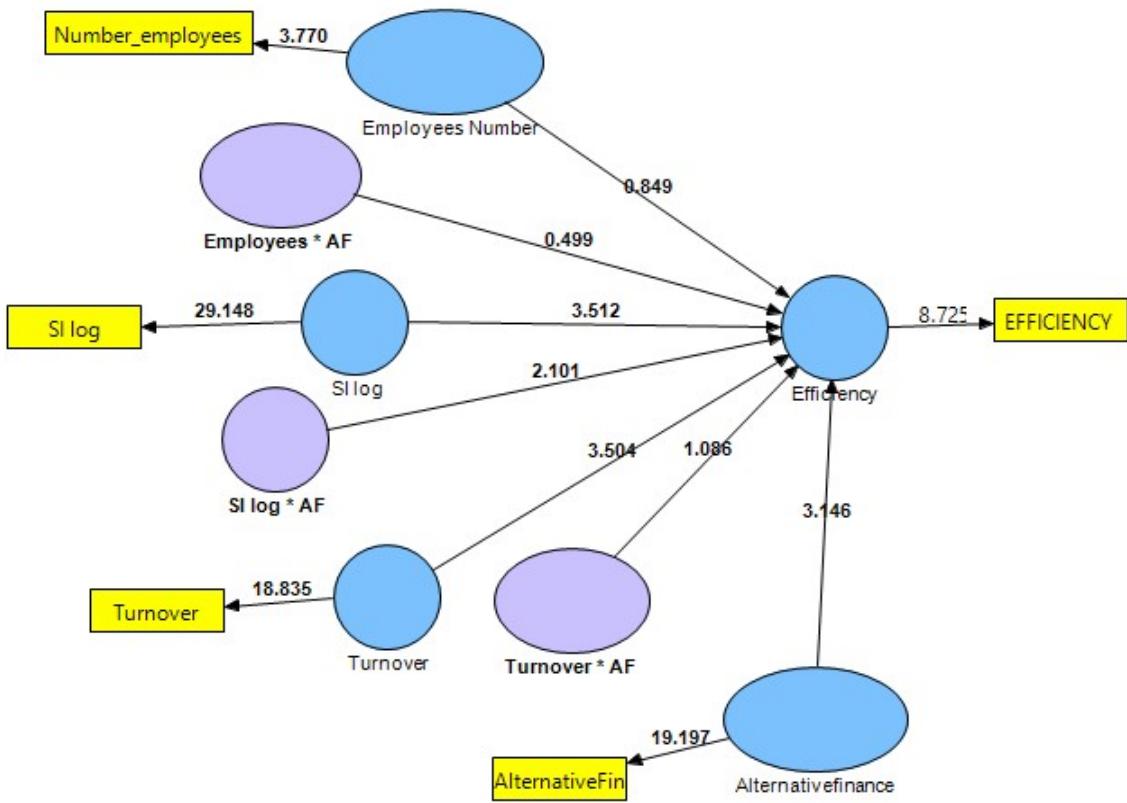


Figure 13(s): T Values for the Size Collapsed Moderated Model

Table 13(j): Regression Weight for the Size Collapsed Moderated Model

Path	Beta	Standard	Standard	T Statis-	P values
		Deviation	Error	tics	
<hr/>					
Alternative finance -> Efficiency	3.1038	0.9865	0.9865	3.1463	0.002032
Employees X AF -> Efficiency	-0.0383	0.0768	0.0768	0.4989	0.618656
Employees Number -> Efficiency	-0.0584	0.0687	0.0687	0.8491	0.397318
SI log -> Efficiency	2.9446	0.8384	0.8384	3.5121	0.000604
SI log X AF -> Efficiency	-0.7766	0.3697	0.3697	2.1007	0.037513
Turnover -> Efficiency	0.2811	0.0802	0.0802	3.5043	0.00062
Turnover X AF -> Efficiency	0.1142	0.1052	0.1052	1.0863	0.279268

Collapsed Competency

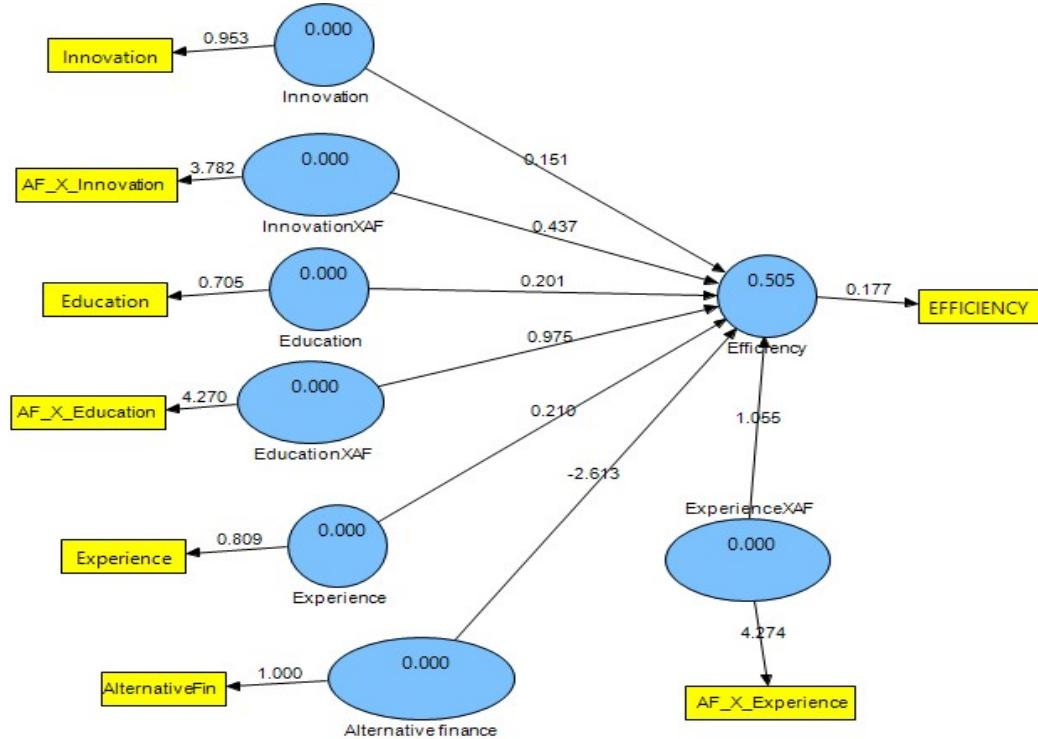


Figure 13(t): Path Coefficients for the Competency Collapsed Moderated Model

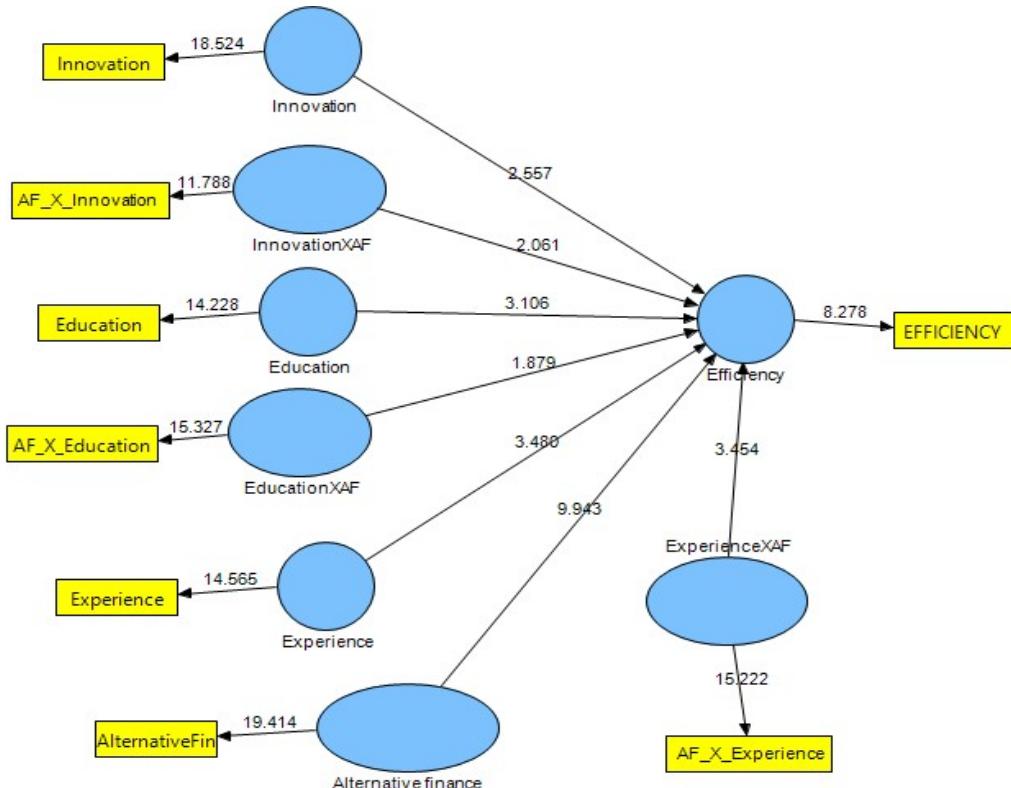


Figure 13(u): T Values for the Competency Collapsed Moderated Model

Table 13(k): Regression Weight for the Competency Collapsed Moderated Model

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
Alternative finance -> Efficiency					
cy	-2.6135	0.2629	0.2629	9.9429	0.000
Education -> Efficiency	0.2013	0.0648	0.0648	3.1059	0.002
Education X AF -> Efficiency	0.9746	0.5186	0.5186	1.8794	0.062
Experience -> Efficiency	0.2102	0.0604	0.0604	3.4805	0.001
Experience X AF -> Efficiency	1.0547	0.3053	0.3053	3.4543	0.001
Innovation -> Efficiency	0.1508	0.059	0.059	2.5573	0.012
Innovation X AF -> Efficiency	0.4366	0.2118	0.2118	2.0612	0.041

Collapsed Size

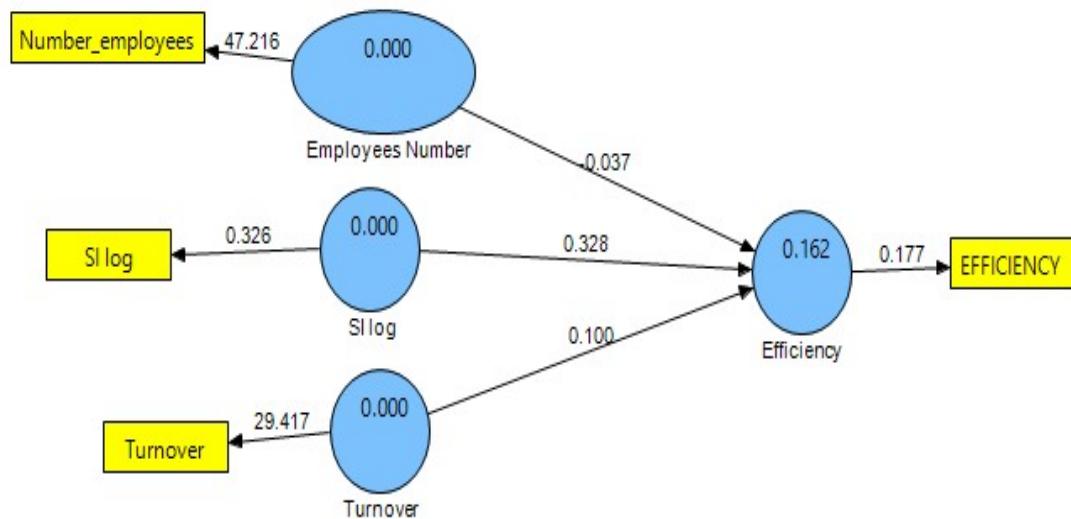


Figure 13(v): Path Coefficients for the Size Collapsed Model

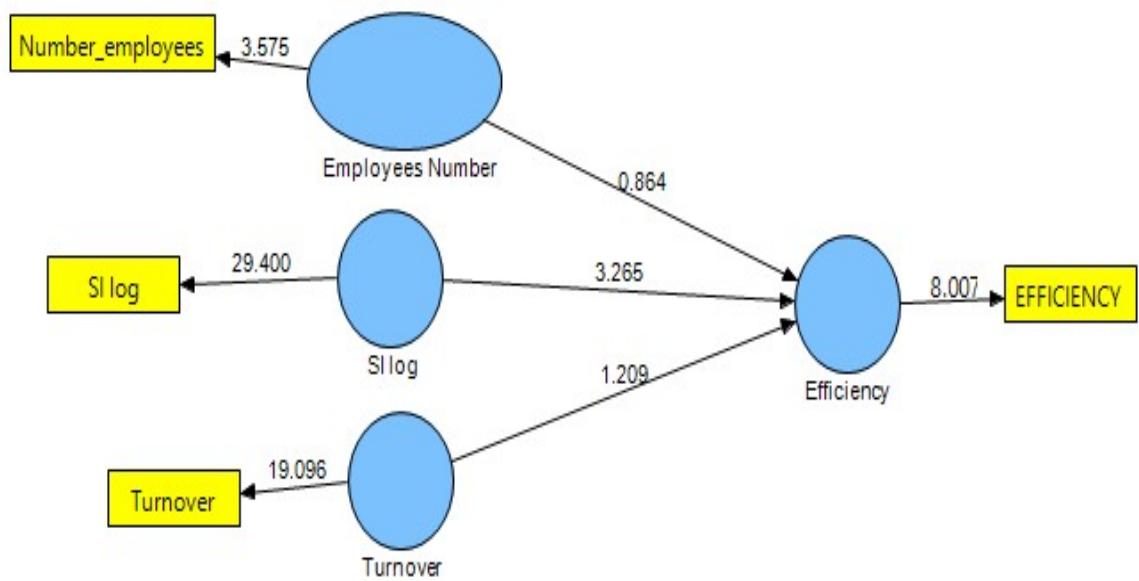


Figure 13(w): T Values for the Size Collapsed Model

Table 13(l): Regression Weight for the Size Collapsed Model

Path	Beta	Standard Deviation	Standard Error	T Statistics	P values
<hr/>					
Employees Number -> Efficiency	-0.0373	0.0431	0.0431	0.864	0.389
Assets -> Efficiency	0.3278	0.1004	0.1004	3.2646	0.001
Turnover -> Efficiency	0.1001	0.0828	0.0828	1.2085	0.229

Collapsed Competency

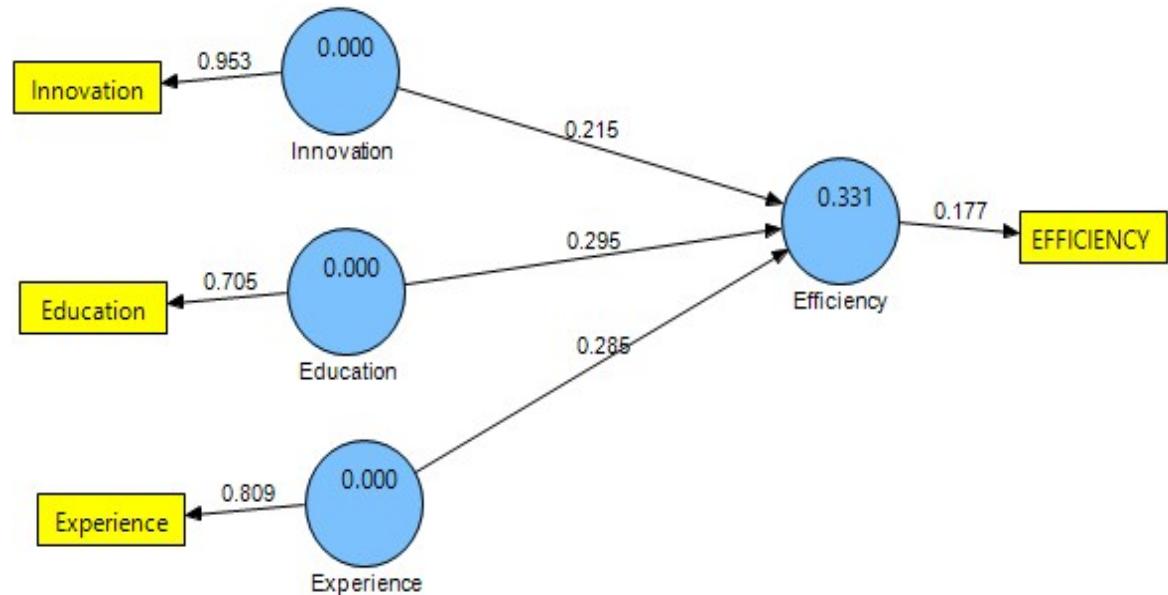


Figure 13(x): Path Coefficients for the Competency Collapsed Model

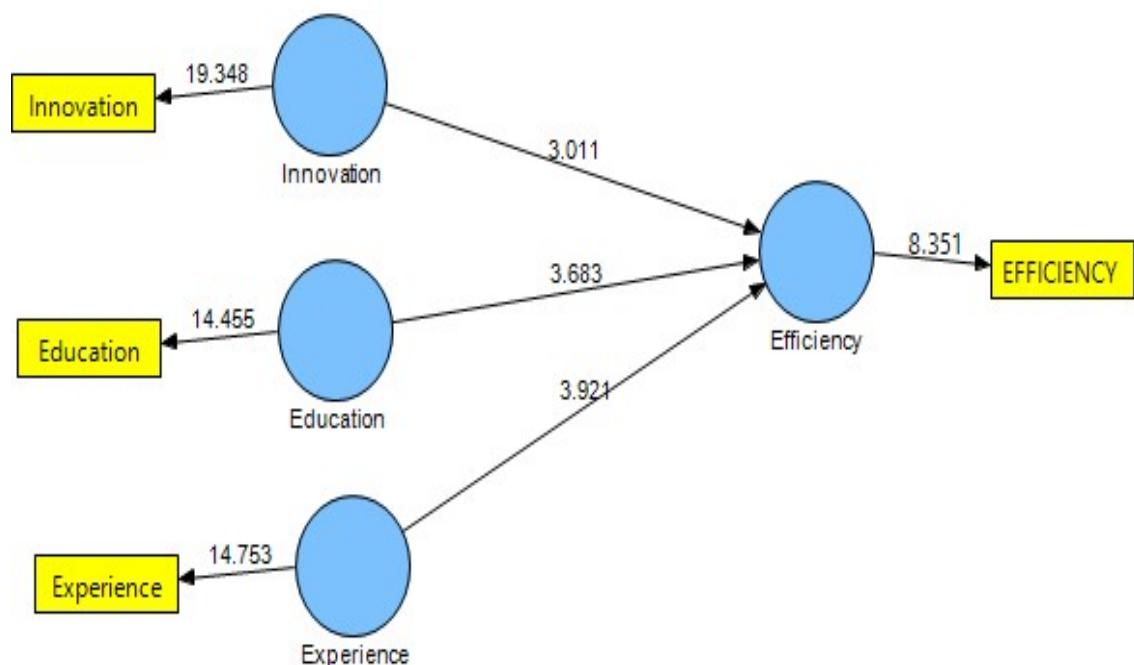


Figure 13(y): T-Values for the Competency Collapsed Model

Table 13(m): Regression Weight for the Competency Collapsed Model

Path	Beta	Standard	Standard	T Statis-	P values
		Deviation	Error	tics	
Education -> Efficiency	0.2953	0.0802	0.0802	3.683	0.000
Experience -> Efficiency	0.2845	0.0726	0.0726	3.9207	0.000
Innovation -> Efficiency	0.2155	0.0716	0.0716	3.0105	0.003

Influence of Alternative Financing on the Relationship between Firm Size and Efficiency of Small and Medium Enterprises in Kenya

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Abstract

Globally, small and medium-size enterprises(SMEs) hold great economic growth potential, however their mortality rate is high, due to lack of credit. The SMEs mortality rate in Kenya is 90% by the second year. Scholarly endeavors to explore the influence of alternative finance (AF) on operational characteristics - efficiency nexus have received little attention, more so for SMEs who have unique financial needs. Although AF appears to be the preferred mode of financing and maintaining start-ups, its impact on the survival, growth and success of manufacturing SMEs is not well documented in Kenya. This study focused on establishing the influence of alternative financing on the relationship between firm-size and efficiency of SMEs in Kenya. The study used a cross-sectional research design. The target population was SMEs registered with Kenya Association of Manufacturers (KAM). The accessible population was 136 SMEs owner/managers. The study used a self-administered semi structured questionnaire to collect primary and secondary data. Data envelopment analysis was used to measure efficiency of SMEs, multiple regression modeling to analyze relationships and hierarchical moderated multiple regression analysis was used to assess the influence of the moderator. The findings revealed that firm-size positively ($\beta = 0.214$, t -value = 4.983, $P < 0.05$) influences efficiency and that alternative finance does moderate (R^2 -Square change 11.1 %) firm size relationships with efficiency. The study recommends that owner/managers of manufacturing SMEs in Kenya should give attention to opportunities for sustainable increase in firm size to improve their efficiency.

Keywords: Alternative Financing, Firm-Size, Efficiency, Small and Medium-size Enterprises

JEL classification: G200; G190.

Influence of Alternative Financing on the Relationship between Managerial Competency and Efficiency of Small and Medium Enterprises in Kenya

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Abstract

Worldwide, Small and medium-size enterprises (SMEs) exhibit inimitable financial needs. While SMEs remain fundamental to economic growth, their mortality rate in Kenya approaches 90% by the second year, mainly owing to lack of credit. However, scholarly endeavors exploring the impact of alternative finance (AF) on managerial competency - efficiency nexus for manufacturing SMEs have received little attention in Kenya. To resolve this conundrum, a thorough study to investigate how AF impacts managerial competency - efficiency nexus is necessary. The study used a cross-sectional research design, employing both qualitative and quantitative research approaches. The target population was 171 SMEs registered with Kenya Association of Manufacturers. The accessible population was 136 SMEs owners/managers. A semi-structured questionnaire was used to collect primary and secondary data. Data envelopment analysis was used to measure efficiency, multiple regression modeling used to analyze the direct relationships while hierarchical moderated multiple regression analysis employed to test moderation. Partial Least Squares Structural Equation Modeling was used to test robustness of our results. The findings of this study demonstrate that managerial competency positively influences efficiency ($\beta = 0.150$, $t\text{-value} = 10.246$, $P < 0.05$), and that alternative finance does moderate managerial competency relationships with efficiency ($R\text{-Square change of } 21.7\%$). We suggest trainings for manufacturing SME owners/managers in Kenya on the pivotal role of alternative finance to facilitate SMEs achieve higher efficiencies and accelerate economic growth.

Keywords: Alternative Financing, Firm-Size, Efficiency, Small and Medium-size Enterprises

JEL classification: G200; G190.