

**CHANGE MANAGEMENT, SITUATIONAL LEADERSHIP, FARMER
CHARACTERISTICS AND SUGARCANE PRODUCTIVITY IN SUGAR
FACTORY CANE CATCHMENT AREAS IN KENYA**

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DECLARATION

I declare that this thesis is my original work and has not previously, in its entirety or in part, been presented for a degree or other academic work.

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DEDICATION

This thesis is dedicated to my loving wife Beatrice and my children: Doreen, Sylvia, Patricia, Selina, Lilian and Samuel for their support and love.

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ACRONYMS AND ABBREVIATIONS

ACP-EU	African, Caribbean and Pacific - European Union
AFA	Agriculture and Food Authority
AgGDP	Agricultural Gross Domestic Product
AGOA	African Growth and Opportunity Act
AMS	Agricultural Management System
CAP	Common Agricultural Policy, 2019
EAC	East African Community
FAO	Food and Agriculture Organization
GOK	Government of Kenya
IFC	International Finance Corporation-A world Bank Group
ISO	International Sugar Organization
KALRO	Kenya Agriculture and Livestock Research Organization
KISCOL	Kwale International Sugar Company Limited
MAFAP	Monitoring African Food And Agricultural Policies
MSC	Mumias Sugar Company
NACOSTI	National Commission for Science Technology and Innovation
NSC	Nzoia Sugar Company
PFP	Partial Factor productivity
SD	Sugar Directorate
SONY	South Nyanza Sugar Company
SOSE	State Owned Sugar Enterprises
SPSS	Statistical Package for the Social Sciences
SUCAM	Sugar Campaign for Change
TC/TS	Tonnes Cane per Tonnes Sugar
TCH	Tonnes Cane per Hectare
TFP	Total Factor Productivity
TRP	Total Resource Productivity
USDA	United States Department of Agriculture
VIF	Variance Inflation Factor
WTO	World Trade Organization

OPERATIONAL DEFINITION OF TERMS

- Cane Catchment Area:** A farmed agricultural business land with specific selection criteria for sugarcane production.
- Change Management:** A systematic approach and application of existing knowledge for better goal attainment. It defines and adopts fresh organizational strategies, structures, procedures and technologies to deal with change within an organization.
- Farmer Characteristics:** Refers to different farmer demographic behavioural factors capable of creating different sugarcane farming capabilities and cane yield outcomes.
- Mill-cane:** Measured as productivity (PFP) in tonnes per unit area (TCH). This is sugarcane supplied to a mill for production of sugar and co-products.
- Productivity :** A general ratio of output to inputs of a business production system.
- Situational Leadership:** This is a complex and highly valued human capability of being able to work with and manage others in different ways (leadership style) in order to attain a desired goal.

ABSTRACT

The Kenya Sugar Sub-sector of 13 mills delivers only 500,000 tonnes sugar per year out of their rated capacity of 800,000 tonnes sugar per year. The peak national sugar consumption of 1,031,055 metric tonnes per year creates a deficit of about 48% for consumption of about 47 million Kenyans. Demand deficit is therefore fulfilled through import quotas which have negative social impacts. However, the import quotas could be diminished by use of enhanced good sugarcane productivity in the 13 mill agricultural areas. Current supply of sugarcane harvest requirements for designed peak production is 8.7 million tonnes sugarcane per year and yet supplies are only 4.95 million tons per year to encourage sugar imports now to the tune of 300,000 to 1,000,000 tonnes per year. The main objective of the study was to establish the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugarcane cane catchment areas of the 13 sugar mills. The specific objectives were to establish the effect of change management, moderating effect of situational leadership and mediating effect of farmer characteristics on sugarcane productivity. The moderated mediating effect was also analysed. A cross-sectional design study based on positivist philosophy was used to collect data at 96% response for a sample of 466 out 478 expected as farmers and management. The study variables data on change management, situational leadership, farmer characteristics and sugarcane productivity was raised by an instrument of structured questionnaires for 13 sugar factories cane catchment areas. Diagnostic tests were conducted to confirm data normality, linearity, and multi-collinearity before actual data analysis and interpretation. The data was analysed using SPSS (version 22) software. Descriptive and inferential statistics was used to analyse quantitative data. Descriptive statistic included means and standard deviation while inferential statistics included correlation and multiple regression analysis. Reliability and validity results indicated that the data was reliable and valid. Findings indicated that there exist a positive significant relationship between change management and sugarcane productivity. On the Baron and Kenny moderating effect, the findings showed that situational leadership has a significant moderating effect on the relationship between change management and sugarcane productivity in Kenya. There also exists a partial mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity in Kenya. The moderated mediating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics was significant. The study recommends that the sugar factories leadership needs to focus on running the sugar factories as a business that must survive in a fierce competitive environment. Activities need to be prioritized based on value addition to avoid losing focus on the mandate of the sugar factories. The practices, the sugar companies or the agribusinesses put in place during the strategic change management, need to be enhanced to ensure continuity of the results obtained.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter covers the linkage between change management, situational leadership and farmer characteristics and sugarcane productivity. This chapter discusses conceptual issues from global, regional and local Kenyan perspective focusing on how change management, situational leadership and farmer characteristics affects sugarcane productivity in sugar factory cane catchment areas in Kenya.

1.1 Background of the Study

The world sugar is obtained largely from sugarcane (90%) and sugar beet (10%) at a per capita consumption rate of about 22.6 kg (ISO, 2019). Globally, the world sugar trade is regulated by WTO of United Nations. The organization regulates world trade through 5 liaison mandates: trade negotiations, managing trade disputes; monitoring national trade policies; giving technical assistance and training for developing countries and cooperating with other international organizations to foster international trade (WTO, 2015). Kenya and other 163 country economic sub-sectors are in the WTO mutuality business union and bound by rules that are designed to encourage eliminating trade distortions and creating competitiveness as already mentioned earlier. Liberalized sugar trade policies post 2017 in EU have hit subsidies on import quotas into Europe. Benefitting African, Caribbean and Pacific (ACP) countries including Kenya have had to experience decline in income and employment in their countries. New sugar trade Policy development has been required to allow recapture of lost revenues and employment opportunities. Attempts to remodel sugar trade in ACP countries may not to be easy (Rakotoarisoa & Chang 2017). This has been proven the case for Kenya (Wachiye, 2012; Gakunga, 2020).

Regionally, Africa has several sugar sub-sector challenges that need addressing before policy development: land use restrictions in war zones in Nigeria, Sudan, Eritrea and Somalia limit access to land for development of sugarcane farms and factory products marketing (Kergna *et.al.* 2014). Irrigation water deficits and poor soils for sugarcane

production in the continent's savannas hamper business for example in Sudan (Mahgoub, 2014). Perhaps most critical is having presence of few good policy developers and practitioners that cannot eliminate large-scale corruption and interference with sugar subsector operational infrastructures. Evidently, therefore inertia to stick to sugar imports is a norm not only in Kenya but linked to other countries. Ghana and Nigeria and most of North African Countries where import mitigation production policies could lead in production of internationally competitive sugar, no competitive policy formulation exists (Olukunle, 2016). However, in Southern Africa, unlike most of net sugar importing Africa, there exist relatively better sugar sub-sector development associated with export trade to USA and rest of Africa (South Africa Sugar Annual, 2019).

As for East Africa, there are challenges of competitive advantage despite privatization for revitalization of productivity. These challenges include government failure to limit sugar import quotas; poor farmer payments on inaccurate cane sugar content and weight; cultivation of low sugar varieties; presence of cane diseases such as smut; and lack of advocacy leaders for best sugar business practice (Tumusiime & Matotay, 2013). Despite these challenges, Tanzanian like Uganda delivers competitively priced sugar that is 60% cheaper than Kenya's (Mati & Thomas, 2019). Common Trade between East African states is enshrined in "The Common Market Protocol (2009)".

Today's Kenya 13 sugar factories can deliver only 500,000 tonnes sugar per year out of potential a potential of 800,000 tonnes of sugar per year. The mills fail to meet the consumption demand of 1,031,055 metric tonnes sugar per year for a population of about 47 million citizens. Gakunga (2020) indicates a widened sugar deficit of 58% relative to sugar consumption needs. Kenya therefore is a net importer of sugar under WTO sugar trade requirements. The country seeks WTO reprieves from the guidelines to protect her industry from COMESA (Kemigisha, 2016). The negative impacts on some sugar sub-sectors particularly for the ACP countries including Kenya have been evident. The negative impacts from sugar trade globalization has justified this study for Kenya. Low sugarcane and sugar productivity have been prevalent and not allowing expected good agribusiness from the sugar-subsector. Hence, this study sought to establish the effect of

change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya.

1.1.1 Change Management

Moran and Brighton (2017) define change management as the process of continually renewing an organization's direction, structure and capabilities to serve the ever-changing needs of external and internal customers. Korir, Mukotive, Loice and Kimeli (2012) define change management as the effective management of a business such that executive leaders, managers and frontline employees work in concert to successfully implement the needed process, technology or organizational changes. According to O'Donovan (2017), change management refers to the discipline that guides people in preparing, equipping and supporting change effectively to drive organizational success and results. Burnes (2004) avers that change is an ever-present feature of organizational life, both at the operational and strategic levels. Due to its importance, change management is becoming imperative, and needs appropriate managerial skills and strategy for restoration of competitive advantage in business environment including that of Kenya's sugar subsector of 13 mills regulated by WTO guidelines (2005).

Under change management, Kurt Lewin established a change management model in 1950s. The model holds that the safe zones is most preferred by the individuals (Sarayreh, Khudair & Barakat, 2013). The model avers that an organization needs to keep adjusting to ever-dynamic environment by adopting the complex adaptive characters for it to survive. Organizations need the three-step model in order to break the status quo and to maintain the equilibrium. The managers are encouraged to change and replace the old practice with new ones for the reforms to be implemented effectively (Kariel, 2016). The model gives a momentous stage involved in implementation of a change process hence right policies and initiatives ought to be involved during the transitioning from old to new practicess. The study investigated how and why change came to be seen as a three-part process and how it is understood as the foundation of a fledgling sub-genre of change management and to influence the theory and practice of change to this day.

1.1.2 Situational Leadership

Leadership refers to the process in which individuals influence certain population or among individuals to achieve goals together (Northouse, 2013). Rivai (2019) define situational leadership as the competence of manager to identify an intimation of his environment, diagnosed, and adopted his leadership style based on the condition. Effective leadership delivers on goals for a vision to be attained by its motivated followers (Nanjundeswaraswamy & Swamy, 2014). Understanding of the leadership capability to harness into skills of followers is therefore very important in any business sector. Moreover, it involves matching the leader to the situation if possible or matching the leadership orientation to the follower maturity. These tools are not easily available for most of Africa and Kenya business sectors due to gaps in the leadership type studies (Kyosabira, 2018; NawoseIng'ollan & Roussel, 2017).

Situational leadership is an adaptive leadership style. This strategy encourages leaders to take stock of their team members, weigh the many variables in their workplace and choose the leadership style that best fits their goals and circumstances. Situational leadership is flexible (Hersey, Blanchard & Natemeyer 1979). It adapts to the existing work environment and the needs of the organization. Situational leadership is not based on a specific skill of the leader; instead, he or she modifies the style of management to suit the requirements of the organization. One of the keys to situational leadership is adaptability. Leaders must be able to move from one leadership style to another to meet the changing needs of an organization and its employees. These leaders must have the insight to understand when to change their management style and what leadership strategy fits each new paradigm (Hersey, Blanchard & Natemeyer 1979).

1.1.3. Farmer Characteristics

Farmer characteristics are derived from demographics of a group of people doing some farming business. Demographics are a set of variables like: Age, level of education, farming experience in years, size of cultivable land, land ownership and finance access (Nkari & Kibera, 2016; Mitullah, Kamau & Kivuva, 2017). Sugar sub-sector studies have previously been done in Kenya and involved general and common sugar industry

characteristics (Mitullah et al., 2017). According to Arsenault (2004), farmer age gaps is described by archetype classification for farmer characteristics and these include Veterans, Baby boomers, Exers and Nexters. Crop yield benefits are known to accrue from knowledge availability in good management practice (GMP) and sharing in best practice crop farming among demographic elements (Wanyonyi, 2016).

The farmer characters proposed for this study are of generational demographic type and unique. The generational demographic characteristics are found at a work place such as a sugarcane farm: Veterans (born, 1922-1943), Baby-Boomers (1944-1960), Xers (1961-1980) and Nexters (born 1981-2000) (Arsenault, 2004). Their cane farming mediation action is determined by their farming contract pegged to the current sugar sub sector regulations. Yield enhancing characteristics will influence cane farming practice on sugarcane productivity (Wanyonyi, 2016).

1.1.4. Sugarcane Productivity

A general agricultural process like sugarcane farming delivers amounts of farm produce in a quantifiable amount to a farmer for a sugar factory. The produce may be converted into productivity, which is defined generally as a ratio between the produce output volume and the volume of inputs to generate the produce (FAO, 2017). At farm level in the sugar sub-sector this measures how, for example, units of land area, in hectares, labour in man hours and capital in a currency, are able to give level of productivity, say in tonnes sugarcane per hectare. This is partial factor productivity or PFP presented as Tonnes cane per Hectare (TCH) (Fuglie et al., 2016). In this study, model productivity metrics involve only PFP such as TCH, at farm level and tonnes sugar per year (Ts/Y) at the factory. Other productivity types are Total Resource Productivity (TRP) important in farming environmental impacts evaluations (Nadia, 2014). Employee skills and abilities are inputs while employee attitudes and behaviours are cellular mechanisms while firm performance is the output, which in turn generates inputs required to maintain the system. The theory argues that performance outputs generate inputs or feedback to the organizational performance linkage (Shin & Konrad, 2017).

In sugarcane cultivation, farmers have to put best agricultural extension practices like planting, weed control, pest and disease management etc. as inputs to attain a harvest or sugarcane productivity as an output. At a sugar mill, sugarcane raw material is an input to sugar productivity through the mill. Any failure in productivity of sugarcane leads to a corresponding decline in sugar productivity. For the sugar sub-sector, sugarcane to the tune of 8.7million tonnes per year is needed by Kenya's 13 mills in this study. However only 4.95 million tonnes sugarcane per year are available creating a sugar supply deficit. For the agribusiness there has to be a disruption for upward cane production for the matching sugar amount at 800,000 and not 500,000 tonnes per year to meet part of consumption demand (AFA, 2019).

1.2. Statement of the Problem

The Kenya Sugar sub-sector has been experiencing a dismal performance compared to others at world and at regional levels. Locally Kenya sugar subsector producing only 500,000 tonnes sugar per year cannot satisfy the citizenry consumption at 1,031,055 metric tonnes per year in the period 2014-2018 (AFA, 2019). In 2020, the sub-sector was at 58% sugar availability on the 1,038,717 metric tonnes sugar per year needed (Gakunga, 2020). Cheap sugar import quotas fill in on the deficits under WTO guidelines 2005 from COMESA and other parts of the world. Imports at USD 350 per tonne sugar are damped in Kenya, as the country's sugar produced at USD 750 per tonne is too expensive for bilateral trade with COMESA, EAC, AGOA and EU countries. Sugar needs' deficits are linked to cane supply shortages. Kenya sugar trade favour's imports to the detriment of social-economic development. It has also been noticed that key sub-sector challenges for operational gaps in sugar crop productivity exist. These include lack of transparency, poor operational efficiency, low profitability and political interference (Mitullah et al., 2017). For these reasons key agricultural productivity gaps are reflected in inefficient land use, poor cane development levels and poor produce prices.

Extant literatures have found inconclusive results on the determinants of sugarcane Productivity. Methodologically, some studies revealed knowledge gaps. Okiiya (2013), Ndahiro, Shukla and Oduor (2015) used secondary data while the current study used primary data thus presenting a methodological gap. The study by Ghazzawi, Shoughari

and Osta (2017) was a critical theoretical review on the relationship between employee productivity and the situational leadership thus presenting a theoretical gap. Conceptually, empirical evidence on the mediating role of farmer characteristics on the relationship between the change management and cane productivity is lacking. Additionally, situational leadership and farmer characteristics have been conceptualized as independent variables in some studies thus presenting conceptual gaps (Nkari & Kibera, 2016; Ghazzawi et al., 2017). Contextually, the current study did not come across any study that has been carried out on change management in cane catchment areas in Kenya and the empirical evidence in Kenyan context was scanty.

The studies fail to provide a general analysis of determinants of sugarcane productivity in sugar factory cane catchments areas in Kenya. Further, the evidence in literature on linkage between change management, situational leadership, farmer characteristic and sugarcane productivity are not conclusive on the nature of the influence and strength of the relationship and there is, therefore the need for further investigation. In addition, most of studies done are based on different contexts other than sugar mills in Kenya. These previous studies exhibited a conceptual gap in that, there are no studies that had reviewed the situational leadership as the moderating variable and farmer characteristics as the mediating variable. Due to the gaps identified in previous research and lack of consensus in findings from previous studies, the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya is therefore open to further scrutiny as to how they relate with moderating effect of situational leadership on the mediation effect of farmer characteristics.

1.3. Objectives of the Study

1.3.1 General Objective

The main objective of the study was to establish the relationship of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya.

1.3.2 Specific Objectives

- i. To determine the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya
- ii. To establish the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya.
- iii. To determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.
- iv. To determine if the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics.

1.4 Significance of the Study

This study benefits academia, organizational policy makers and those practicing sugarcane farming at the farms respectively. The analysis and findings of this study may add to the theoretical discussions and existing knowledge on the effect of change management through situational leadership and farmer characteristics for sugarcane productivity

On policy, the findings may enable and enlighten the policy makers to develop policies in the Ministry of Agriculture and other affiliated stakeholders on production and productivity. On practice, the study may potentially give opportunity to AFA to offer competitive operations in the sugar sub-sector over-sighting through realigning formulation of appropriate technologies, innovation, training, strategic and operational management for sugar production and productivity.

To the scholars and researchers, the findings might stimulate interest and further research in the sugar sub sector. The study may unveil better understanding on theory engagement on studies in the sugar sub sector. Therefore, allowing business remodelling for competitive advantage.

1.5 Scope of the Study

The study sought to establish a new sugarcane production model for Kenya sugar sub sector of 13 mills. The geographic scope was in Kenya. These 13 mills were: Butali, Kabras, Nzoia, Mumias; Chemelil, Muhoroni, Miwani, Kibos, Soin, Transmara, Sony, Sukari and KISCOL collectively have a productivity deficit at 4.95 million tonnes sugarcane cane and thus managing only 500,000 tonnes of sugar against a target of 800,000 tonnes sugar per annum from 8.7 million tonnes sugarcane per annum.. Therefore, sugar imports in the range of 300,000 to 1,000,000 tonne sugar per year are inevitable with negative social economic impacts under WTO guidelines 2005.

This study model for improved sugar cane productivity targeted 394,321 farmers and their extension leaders at all the 13 mill cane catchments (Appendix VII). The content scope was change management, farmer characteristics, situational leadership and sugarcane productivity in sugar factory cane catchments areas in Kenya. The time scope was between July 2021 and May 2022.

1.6 Limitations of the Study

Limitations or constraints in predictor data collection and ultimately give unreliable interpretation of study results. Accurate data collections methods on change management, moderating variable, situational leadership styles, and mediating farmer characteristics must be in place to reliably provide correct interpretation of study outcomes: Correct sample locations were achieved by marked borders of rivers, mountains and roads. Inaccurate databases were interrogated for accuracy through owners by research teams. Quality respondent interviews was achieved by avoiding double pilot study respondents in the main study survey. Farmers wanting to engage with research teams only on being paid a “fee” was avoided through insisting on process integrity policy. Pilot study campaigns was used to get rid of limitations.

1.7 Delimitations of the Study

Delimitations are factors that curtail scope of a study. COVID 19 infections between respondents and research team were real in this study. Use of COVID 19 protocols

including wearing of masks and keeping recommended safe contact distance of 1.5 metres between humans were used to eliminate infection potential during study progression.

1.8 Chapter Summary

Chapter one provides the contextual and conceptual underpinnings. The chapter discusses the variables in subsections. The conceptual discussion examines the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. The sugarcane productivity forms contextual discussion.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviewed literature on sugarcane productivity in sugar factory cane catchments areas in Kenya. The literature is mainly on the Change Management, Situational Leadership, Farmer Characteristics and Sugarcane Productivity. The specific areas covered include different change management indices and their relationship with Sugarcane Productivity.

2.1 Theoretical Literature Review

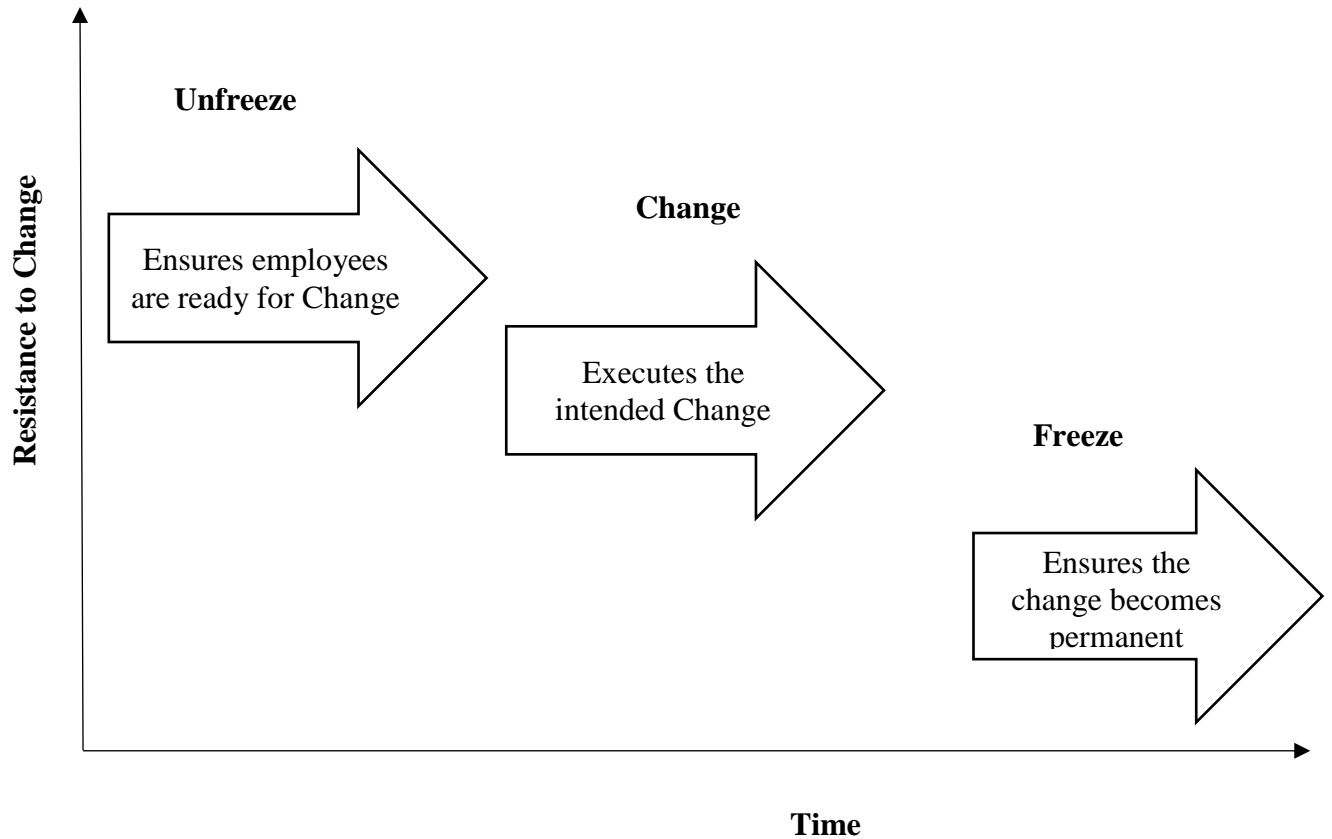
Scholars have developed various contemporary theories that attempt to link of change management, situational leadership and farmer characteristics on sugarcane productivity. The study was anchored on General Systems Theory and supported by the Kurt Lewin Change Management Theory, Situational Leadership Theory, Strauss-Howe Generational Theory and McKinsey 7S.

2.1.1 Kurt Lewin Change Management Theory

Kurt Lewin established this model in 1950s. The model holds that the safe zones is most preferred by the individuals (Sarayreh, Khudair & Barakat,2013).The model is considered as a three-step change theory involving ,strategically: unfreezing, transition and refreezing processes. Stepwise, these give change managers a chance to implement reforms. The model avers that an organization needs to keep adjusting to ever-dynamic environment by adopting the complex adaptive characters for it to survive. Organizations need the three-step model in order to break the status quo and to maintain the equilibrium. The managers are encouraged to change and replace the old practice with new ones for the reforms to be implemented effectively (Kariel, 2016). The model gives a momentous stage involved in implementation of change process hence right policies and initiatives ought to be involved during the transitioning from old to new.

Kurt Lewin developed a change model involving three steps: unfreezing, changing and refreezing (Lewin, 1947). For Lewin, change entails creating the perception that a change

is needed, then moving toward the new, desired level of behaviour and finally, solidifying that new change as the norm (Figure 1):



Note: X-axis Change campaign time. Y-axis Resistance to change.

Figure 1: Change Management Model

Adopted from Kurt Lewin (1947) Change Management Model

Before a change can be implemented, it must go through the initial step of unfreezing. This is necessary, as many people will naturally resist change, the goal during the unfreezing stage is to create an awareness of how the status quo, or current level of acceptability, is hindering the organization in some way. Old behaviors, ways of thinking, processes, people and organizational structures must all be carefully examined to show employees how necessary a change is for the organization to create or maintain a competitive advantage in the marketplace (Lewin, 1947). Unfreezing involves getting

people to gain perspective on their day-to-day activities, unlearn their bad habits, and open up to new ways of reaching their objectives. The current practices and processes have to be reassessed for the wheels of change to be set in motion. Communication is especially important during the unfreezing stage so that employees can become informed about the imminent change, the logic behind it and how it will benefit each employee. The idea is that the more working teams know about a change and the more they feel it is necessary and urgent, the more motivated they accept to mainstream the change (Tang, 2019).

Once team members have opened up their minds, change can start. The change process can be a very dynamic one and, if it is to be effective, it will probably take some time and involve a transition period. Lewin recognized that change is a process where the organization must transition or move into this new state of being. This changing step also referred to as transitioning or moving, is marked by the implementation of the change (Rosenbaum, More & Steane, 2018). This is when the change becomes real. It is also, consequently, the time that most people struggle with the new reality. It is a time marked with uncertainty and fear, making it the hardest step to overcome. During the changing step people begin to learn the new behaviours, processes and ways of thinking. The more prepared they are for this step, the easier it is to complete. For this reason, education, communication, support and time are critical for employees as they become familiar with the change. Again, change is a process that must be carefully planned and executed. Throughout this process, employees should be reminded of the reasons for the change and how it will benefit them once fully implemented (Lewin, 1947).

Lewin called the final stage of his change model freezing. Once the organizational changes have been made and the structure has regained its effectiveness, every effort must be made to cement them and make sure the new organization becomes the standard. The changes made to organizational processes, goals, structure, offerings or people are accepted and refrozen as the new norm or status quo. Lewin found the refreezing step to be especially important to ensure that people do not revert to their old ways of thinking or doing prior to the implementation of the change. Efforts must be made to guarantee the change is not lost; rather, it needs to be cemented into the organization's culture and

maintained as the acceptable way of thinking or doing. Positive rewards and acknowledgment of individualized efforts are often used to reinforce the new state because it is believed that positively reinforced behavior will likely be repeated (Lewin, 1947).

The theory is critiqued for lacking the accountability for the interaction of the individual, organization and the society and for failing to explain the complex involved in the change process as its process is linear. The model was significant to the study as it holds the relevance of farmers' empowerment through trainings, strategic leadership and operational changes. In the world of competition, sugar factory cane catchments areas like any commercial entity have to embrace strategic changes and operational changes for its survival.

Cummings, Bridgman and Brown (2016) examined Kurt Lewin's model of unfreezing, changing and freezing as the classic way of doing things. Lewin's theory has been criticized in the past as overly simplifying the process yet other studies regard it as foundational in the process of change management. By comparing what Kurt Lewin wrote about changing being a 3 step process with how it has been presented in more recent works, this study argues that Lewin did not develop the model but it took shape after his death. The study investigated how and why change came to be seen as a three-part process and how it is understood as the foundation of a fledgling sub-genre of change management and to influence the theory and practice of change to this day. The study suggests that questioning this foundation can encourage innovation by prompting managers and employees to look at change from a different point of view. This study suggests that peeling back existing literature on the findings and going through original sources of this information rather than using secondary materials can be a worthwhile exercise because it can support and inspire new thinking as well as to give reassurances on what is considered valid.

2.1.2 Situational Leadership Theory (SLT)

The situational leadership theory (SLT) was developed in the 1970s by Paul Hersey and Ken Blanchard. SLT refers to the type of leadership adopted by a leader with regards to a

particular situation and is deemed most effective style of leadership from time to time. The validity of the theory is affected by the competence and the commitment of the follower. The SLT is premised upon a well-structured style of leadership that arises from the leadership need (Thompson & Glasø, 2015). Thompson (2008) avers that establishing a leadership style which is specific to a follower is sometimes difficult. Leaders must be able to adapt to the behaviours of their followers by assessing the situations Puni, Ofei and Okoe (2014) view the leadership styles as a behavior associated with the leader of the organization as it's affected by the surrounding environment. The difference between situational leadership and other leadership styles is that situational leadership incorporates many different techniques. The style of choice depends upon the organization's environment and the competence and commitment of its followers.

The theory is based on two concepts: leadership itself, and the developmental level of the follower. Hersey, Blanchard and Natemeyer (1979) developed a matrix consisting of four styles: telling leaders, selling, participating and delegating. Telling leaders (specific guidance and close supervision): These leaders make decisions and communicate them to others. They create the roles and objectives and expect others to accept them. Communication is usually one way. This style is most effective in a disaster or when repetitive results are required. Selling (explaining and persuading): These leaders may create the roles and objectives for others, but they are also open to suggestions and opinions. They "sell" their ideas to others in order to gain cooperation. Participating (sharing and facilitating): These leaders leave decisions to their followers. Although they may participate in the decision making process, the ultimate choice is left to employees. Delegating (letting others do it): These leaders are responsible for their teams, but provide minimum guidance to workers or help to solve problems. They may be asked from time to time to help with decision making.

Situational leadership is an adaptive leadership style. This strategy encourages leaders to take stock of their team members, weigh the many variables in their workplace and choose the leadership style that best fits their goals and circumstances. Situational leadership is flexible (Hersey, Blanchard & Natemeyer 1979). It adapts to the existing work environment and the needs of the organization. Situational leadership is not based

on a specific skill of the leader; instead, he or she modifies the style of management to suit the requirements of the organization. One of the keys to situational leadership is adaptability. Leaders must be able to move from one leadership style to another to meet the changing needs of an organization and its employees. These leaders must have the insight to understand when to change their management style and what leadership strategy fits each new paradigm (Hersey, Blanchard & Natemeyer 1979).

At its core, Situational Leadership provides leaders with an understanding of the relationship between an effective style of leadership and the level of performance readiness that followers exhibit for a specific task (Thompson & Glasø, 2018). With application across organizational leaders, first line managers, individual contributors and even teams, Situational Leadership utilizes task specificity to serve as a mechanism through which leaders maximize their influence-related impact. Situational Leadership utilizes a common leadership language that can be applied across any boundary. Implementing the model requires a leader to establish objectives, assess performance readiness and determine the appropriate leadership style within the context of a given situation and work environment (Thompson & Glasø, 2018). Even when attempting to influence the behavior of international employees, where interactions may be impacted by differences in culture or language, a leader can apply Situational Leadership to navigate any given situation or interaction (Hersey, Blanchard & Natemeyer 1979).

Situational leadership takes the motivational level of employees into consideration when selecting a leadership style (Walls, 2019). For example, a motivated and willing employee will require less coaching than an unmotivated individual. Since motivation largely comes from within the individual, leaders must understand what motivates their employees or risk diminishing engagement and productivity. Situational Leadership can provide leaders and managers with the tools necessary to influence others and to help them appropriately cultivate and exercise their power to influence and affect change. As organizations strive to be more nimble and respond to changes at the speed of business, leaders are essential. While power often gets a bad rap in business, it can be a positive driver of influence.

Ali (2017) conducted a study to establish whether the “one size fits all” premise is true. The purpose of this was to examine the bigger concept of situational leadership and how effective it is in improving leadership. Analytical literature review was conducted and the findings found that successful leaders change their styles of leadership based on how mature the people they were leading were, the task they were supposed to handle and the context. The study examined situational leadership alongside other styles of leadership that could be merged to give a good blend of leadership and administration. It started with a precise analysis of leadership theories and followed it up by examining pertinent styles of leadership relevant to the components of situational leadership. The paper concluded that success could be guaranteed if situational leadership can be applied alongside other styles in leadership and administration. The study provides a solid basis for further research on leadership. It also offers a good opportunity for situational leadership to be refined in the interests of leaders.

Van der Hoven (2018) undertook a study to examine the impact of situational leadership theory on the performance of staff in the South African health care. A lack of efficiency in the South African healthcare workforce had a disabling effect on the health of the nation as a whole. In addition, the Future Health Index of 2017 analyzed and ranked the healthcare sectors of 19 countries with South Africa as the lowest ranked in terms of efficiency. The study used a cross-sectional approach guided by the situational leadership theory. In-depth interviews were used to collect data from four private hospital managers in Durban. Qualitative content analysis was applied to analyse the collected data. The study sought to get a deep understanding of the performance of the staff as perceived from the hospital managers. The findings of the study showed that the staff of the private hospitals displayed poor performance, a lack of dedication to duty, a resistance to change and an unwillingness to learn new skills. Additionally, themes relative to leadership strategies were outlined and discussed.

The theory is criticized as not encompassing all or what the leaders do. SLT has revealed some flops from the aspect of design involved in the research, the content and the measurement (Thompson & Vecchio, 2009). The SLT is important to the study as it

highlighted the relationship between the situational leadership and the sugarcane productivity.

2.1.3 Strauss-Howe Generational Theory

William Strauss and Neil Howe laid the groundwork for the Generational theory in 1991. Generational demographics is a new study area where academia interest has been drawn to (Woodward, Vongswasdi & More, 2015). According to the theory, society has character products of recurring generational personas (archetypes) based on thematic life experiences. That is each persona of a new era or a turning point has unique social, political, and economic climate characteristics including communication and technology; preferred job characteristics; work values; work attitudes; work place/career behaviours; and leadership preferences (Woodward et al., 2015).

As already stated the theory describes a recurring cycle of age groups referred to as generations or archetypes with specific behavioural patterns in society. This theory calls for unique understanding of the archetype mix for optimized engagement for productivity in society at a work place. One archetype mix has been unveiled by Arsenault (2004). The mix comprises of Veterans; Baby boomers; Xers and Nexters covering the period when the Kenya Sugar sub-sector is non-performing on sugarcane farming work place. These farmers are available with specific characteristics ready to be engaged in sugarcane productivity with varied capabilities some which may enhance current decline in raw material supply at the sugar subsector mills.

2.1.4 McKinsey 7S Theory

The 7S Model was coined by Tom Peters and Robert Waterman of McKinsey and Company in 1980s. The theory holds that the 7s elements ought to be adjusted for a successful change to occur. The 7s variables consists of the style, staff, strategy, structure, skills and the shared values (Manktelow & Carlson, 2015). The change implementation of an organization is affected by the 7s variables (Rajala et al., 2012). The theory needs to be supported and reinforced for better performance in an organization (Tarus, Gichoya & Muumbo, 2015). The 7S model analyses and addresses the design of the organization.

The 7S model is useful in realignment of the circumstances in enhancing performance in the organization also in determining the right approaches to change implementation (Alshaher, 2013). This theory provides insights on the steps that Sugar Factory Cane Catchments Areas adopt to implement change with minimal difficulty. The seven levers relate with the variables under the study that influence effective change implementation in sugar factory cane catchments areas. The theory provides insights in the implementation of change in sugar factory cane catchments areas as a function of strategic leadership, employee training and operational change.

Alshaher (2013) conducted a study to establish a theoretical basis for decision-making and strategic thinking about e-learning systems using McKinsey 7S model. The paper proposes a new model for assessing how ready an organization is to implement the e-learning system projects on the McKinsey 7S model using fuzzy logic analysis. The study considers 7 dimensions in their assessment of the current situation of the organization before the system is implemented. This helps to identify any weaknesses that may lead to the failure of the project. The study used questionnaires and group interviews to collect data from three colleges in Iraq's Mosul University. According to the multidimensional model based on the 7S framework, success in building an e-learning system can be achieved at the University of Mosul. A readiness assessment guided by the 7S framework on 23 factors can help to avoid failure or weaknesses that face the implementation of the e-learning system. This helps the administration to make choices that will help achieve success and reduce the high costs involved.

According to Gechkova and Kaleeva (2020) presented the McKinsey 7S model as a way of meeting change in critical infrastructure. The McKinsey 7S model analyzes the work of different parts and aspects of the organization. As a concept, it can be used by companies and their leaders to examine how effective a business is, its strategic plan, the competence of the staff and the satisfaction of the employees. More and more organizations are looking for new ways to improve their productivity in their business cycles so as to have harmony in the company and improves their competitiveness in the market. The model can be used in mergers and acquisitions and in identifying the weak areas in the organization but also in creating new opportunities. The McKinsey 7S

framework is built on seven fundamental for certain organizational areas: structure, strategy, skills, staff, style, systems and shared values. Based on these elements, the model fully outlines every aspect the organization deals with in its daily operation and in the long term. Getting a clear understanding in these factors when combined with other tools to achieve the desire prosperity. The study found that the McKinsey 7S model could be of use in the security and defence industry especially in critical infrastructure. The airport system as part of this infrastructure is exposed to multiple and varying threats and risks. Stability and safety are very important. New mechanisms for achieving and preserving security need to be put into place. This research presents the McKinsey 7S model in critical infrastructure by: Describing the roles, the elements and implementation of the model along with the advantages and disadvantages; Outlining the 7 elements of McKinsey in the airport system and how they can be introduced in improving the security and stability of infrastructure and improve overall functionality; analysing the environment of the airport system and presenting assumptions on how the model would positively affect the organization. Finally, the article introduces the mechanisms on the behavioural analysis in enhancing security and the improvement of the internal organizational environment and improving the personnel at the airport.

This theory was developed in the late 1970's by McKinsey first as a conceptual framework. It is useful in diagnosing the causes of organizational change and in formulating policies for improvement. The model consisted of an attempt to provide an answer to the frustration that executives face when dealing with general management problems effectively. The model surpasses the classic simplified notion that "structure follows strategy" by linking strategy with structure as well as with five other elements. These elements include shared values, skills, systems, staff, style, structure and strategy. Channon and Caldart (2015) state that the seven elements in the model are mutually interdependent. This way, the study sought to highlight and hence address the complexity of general management decisions more effectively. The authors postulate that having a certain fit or harmony between the seven elements of the model is an important feature if strategies are to be implemented successfully.

According to Hanafizadeh and Ravasan (2011), implementing an Enterprise Resource Planning (ERP) systems is a complicated, long and costly process that faces numerous challenges and failures. As such, it is necessary to conduct readiness assessments at the start of the ERP implementation project to identify areas of weakness that may lead to the failure of the project. The study proposed a new model to help assess the readiness levels of an organization to adapt the ERP project using a confirmatory factor analysis. This method proposes the construct of ERP readiness based on the 7 dimensions of the McKinsey 7S theory. Using this model, the current situation of the organization can be determined and then the required changes can be applied before the implementation of the system. The proposed framework is then applied and the advantages of this model over others can be illustrated.

2.1.5 General Systems Theory (GST)

General Systems Theory (GST) was modeled by Ludwig (1950). General systems theory adds a reversal causal effect of firm performance. GST is inculcated in developing broad and general applicable concepts and principles as specific concepts as opposed to one specific concept. Employee skills and abilities are inputs while employee attitudes and behaviours are cellular mechanisms while firm performance is the output, which in turn generates inputs required to maintain the system. The theory argues that performance outputs generate inputs or feedback to the organizational performance linkage (Shin & Konrad, 2017).

In sugarcane cultivation, farmers have to put best agricultural extension practices like planting, weed control, pest and disease management etc. as inputs to attain a harvest or sugarcane productivity as an output. At a sugar mill, sugarcane raw material is an input to sugar productivity through the mill. Any failure in productivity of sugarcane leads to a corresponding decline in sugar productivity. For the Kenya sugar sub-sector with 13 mills in the study the designated cane crushing capacity is 8.7 million tonnes per year for expected delivery of 800,000 tonnes sugar. The actual cane available however is only 4.95 million tonnes sugarcane per year for an output of only 500,000 tonnes sugar per annum respectively. For the agribusiness to thrive there has to be a disruption in sugarcane productivity for upward performance for the matching of sugar amount at

800,000 tonnes per year (AFA, 2019). Sugarcane and allied sugar production is a typical GST relationship.

Caws (2015) wrote a 3-part paper to explain the past and potential of the general systems theory. First, it discussed the original need and purpose of the general systems theory (GST), why the author thought it is important and how they became involved in it. The study also reflects on the concept of isomorphism and its rewards. Secondly, the author discussed the direction of his work after he served as President of the Society for General Systems Research and how the research of the grand systems theory changed its direction from its early trajectory and in particular its focus on the difference between system and structure and the role of individual subjectivity in the structure of an organization. The final part discussed the place of the General Service Theory in the philosophy of science especially with regard to the unity of science movement and the potential that it has for the organization. The study also examines what information can be brought to light by the concept of system.

Greene (2017) wrote an article examining the role of the general systems theory on human behaviour theory and social work practice. The author outlines select general systems theory principles and assesses the major contributions of the general systems theory to social work practice. General systems theorists have offered a means of guaranteeing stability and change within social systems that did not exist before. The idea that social systems are dynamic and keep changing with their environment, are purposive, goal oriented rather than being static is an important consideration to have when solving problems and determining the possibility for change and intervention. Another very crucial property of family systems with regard to assessment and intervention. Communication can be considered as a system of transmitting information between two or more people, the incremental or cumulative exchanges are the basis of evolving relationships between people.

In general, GST handles a multiplicity of variables within business environments including big, complex and open systems as those in the sugar-sub sector. GST is relevant in all business environments but has one great weakness of its inability to

pinpoint and explains failure in complex natural systems for rapid identification and reestablishment of an equilibrium. This is a key challenge that has justified this study.

2.2 Empirical Literature Review

This chapter has empirical knowledge in sub-chapters on: change management and sugarcane productivity, change management, situational leadership and sugarcane productivity; change management, farmer characteristics and sugarcane productivity and change management, situational leadership, farmer characteristics and sugarcane productivity as key sub-chapters.

2.2.1 Change Management and Sugarcane Productivity

Situational leaders championing the change management strategically will attain a new sub-sector vision for lifting cane supply for 800,000 tonnes sugar per year production in the 13 mills sub-sector. This study seeks a justification for farming model change in the cane catchment areas realignment in some cultural practices, understanding leadership tools and the farmer characteristics that could be engaged for good yield response of 8.7 million tonnes sugarcane.

Kimhi and Oliel (2019) studied change management and organizational performance in selected manufacturing companies. The study used primary data. Descriptive survey design was adopted. Questionnaire was used to collect data. The study findings revealed that change management strategies had a positive and a statistically significant effect on organizational performance. The results also indicated a correlation between leadership changes and performance. The study however was limited to manufacturing companies in Nigeria. This study is about sugarcane productivity in sugar factory cane catchment areas in Kenya.

Kurgat (2019) studied the relationship between change management and organizational performance of media companies in Kenya. The study used questionnaires to collect primary data. Interviews were conducted via phone calls. Regression analysis was done using SPSS version 22. Descriptive analysis was used to determine the relationship between change management and organizational performance. The study findings were

statistically significant for the relationship between change management and performance of Kenyan media firms. The study failed to introduce the moderating and the mediating variables. This study of the sugar sub-sector introduced the farmers' characteristics and situational leadership to establish the relationship between change management and productivity.

Al-Jaradat, Nagresh, Al-Shegran and Jadellah (2013) examined the relationship between change management and performance. The study adopted the case study research design. Random sampling was employed. Data was collected using questionnaires. The collected data was analysed through SPSS version 22. The study results indicated a statistically significant relationship between change management and performance. The study was limited to university libraries in Jordan. The study did not consider the moderating and mediating variables. This study has been done in sugar factory cane catchment areas in Kenya. This study will introduce farmer characteristics and situational leadership as an intervening and moderating variable.

Kimhi and Oliel (2019) conducted a study on change management and organizational performance in Manufacturing Companies. The study was anchored on organizational change and Lewin's Three Step Model. Descriptive survey design was adopted, and primary data was employed. The study found that technological changes have a positive significant effect on organizational performance in manufacturing companies. It was established that change management strategies have a positive significant effect on organizational performance in manufacturing companies. Leadership changes have a positive significant influence on organizational performance in manufacturing companies. The study concluded that change management has a positive significant effect on organizational performance in manufacturing companies.

Sung and Kim (2021) conducted a study on the effect of change management on organizational innovation. The study was an empirical study on the impact of change management on organizational innovation through innovative behaviour in the public sector. The independent variables were four elements of change management (organizational goal, transformational leadership, participation and communication,

education and training), the dependent variable was organizational innovation, and the mediating variable was the innovative behaviour of members. The results indicated that change management factors have a positive effect on innovative behaviour and organizational innovation. In addition, public officials' innovative behaviour played a mediating role between change management and organizational innovation. It was confirmed that the innovative behaviour of organizational members is essential to achieve organizational innovation. Among the factors of change management, participation and communication had the highest influence on innovative behaviour and organizational innovation.

Olajide (2014) carried out a research on change management and its effect on organizational performance of Nigerian telecoms industries using empirical insight from Airtel Nigeria. A total of 300 staff of Airtel were randomly selected from a staff population of 1000. Three hypotheses were advanced to guide the study and data collected for the study were analysed using One-way Analysis of Variance. The result revealed that changes in technology had a significant effect on performance and that changes in customer taste had a significant effect on customers patronage. The result also showed that changes in management via leadership have significant effect on employee's performance.

Ndahiro, Shukla and Oduor (2015) examined the effect of change management on the performance of government institutions in Rwanda. The study adopted survey research design, and the target population of employees of Rwanda Revenue Authority (RRA). Data was collected using questionnaires and interviews and analyzed using SPSS and Microsoft Excel. Based on the data collected, the study concluded that all changes made in RRA in the past four years have been well planned and implemented. Most of the employees in the institution have generally embraced the changes made in the organization, and at resulting to overall organizational performance.

Nyasha (2017) examined the impact of organisational change in Gauteng Provincial Department of Infrastructure Development. The study focused on the strategies that should have been implemented in order to reduce the resistance to change and minimise

the negative impact change brought to the employees. The study also focused on employee satisfaction and the impact of change on the psychological contracts from a broad perspective of employees within the organisation. In this study, descriptive survey design was adopted. The outcome of the survey on change management and employee involvement indicated that the change vision was not communicated, while employee involvement was minimal in all stages of change processes.

Giauque (2015) examined the attitudes towards organizational change among public middle managers. This study aimed to identify social and organizational antecedents of positive attitudes towards change. The investigated population was composed of middle managers working in Swiss public hospitals, which were currently being confronted by major reforms. Partial mediation effects of organizational commitment in the relationships between independent variables and positive attitudes towards change were also controlled. The findings showed that perceived social support (work relationships with colleagues and supervisors) as well as perceived organizational support (employee voice and participation; information and communication; work-life balance) are positively and significantly related to positive attitudes towards change. Stress perception is shown to have a negative impact on positive attitudes towards change.

Ju-Chun (2015) investigated the impact of change management on employee satisfaction and engagement. The main purpose of this study was to figure out employees attitudes toward the new performance appraisal program and to examine whether three different types of appraisal processes differentially affected job satisfaction and employee engagement. The second purpose of this study was to investigate the relationship between performance appraisal reform, job satisfaction, and employee engagement. The results showed that employees who received the new performance appraisal program evaluated the program more positively and showed more job satisfaction than those who did not. In particular, the implementation effects of this new performance appraisal program were most highly rated by employees who used the KPI to rate their job performance. Moreover, employees attitudes toward the new performance appraisal program were positively related to their job satisfaction and employee engagement. Lastly, most employees regarded themselves as engaged workers.

Ahmed, Rehman, Asad, Hussain and Bilal (2013) examined the impact of organizational change on the employee performance in the banking sector of Pakistan. In this study Primary and secondary data collection techniques were used for obtaining data. Copies of the questionnaire were used for primary data collection. Leadership, communication, procedural justice, employee development, tolerance to change are the variables considered for the study. The results showed that organizational change had a positive significant impact on employee performance in the banking sector of Pakistan.

Selvadurai (2013) examined change management in the public sector. The study explored public sector employee perceptions regarding what strategies are required to create change that achieved desired results in public sector organizations. A qualitative research design was employed, involving in-depth interviews with six employees of the Canadian public service to test the alignment of Kotter's eight step model with the perceptions of public sector employees. The study revealed that three of Kotter's eight steps were aligned with the perceptions of the public sector employees interviewed. These three steps were forming a powerful guiding coalition, creating a vision, and communicating the vision.

Safo-Adu (2014) conducted a study on the role of change as an organizational development tool at EGH through exploring its historical drivers of change, prevalent resistors to change and identifying the critical success factors for managing change at the hospital. The drivers of change identified were categorized as either internal or external drivers. Data analysis showed that internally, power and influence is the main internal driver of change; whereas externally, political factors are the main driver of change at the Hospital. The study revealed that the sources of resistance to change were primarily from blind resistance, intellectual (ideological) resistance and political resistance. Many factors on the personal level underlying these resistances were isolated, of which poor communication was identified as the major reason why people resist change at the Hospital. Of the nine (9) critical success factors discovered for effective change at EGH, personnel training was found to be the factor with the highest effect on successful implementation of and acceptance of change.

Ugwu, Osioma, Onwuzuligbo and Nnaji-Ihedinmah (2020) conducted a study to examine the effect of change management on the productivity of deposit banks in Imo State. Data was collected through a descriptive survey design and the use of a questionnaire. The population involved in the study included 124 staff from a number of banks in Owerri. These banks included United Bank for Africa Plc, Fidelity Bank, Eco-bank and Access Bank. Only 116 out of the 124 questionnaires administered were duly filled and returned. These 116 were used to analyze the data. A simple regression analysis was conducted and the result was used to test the research hypothesis. The null hypothesis was rejected at 0.05 significance level. As a result, the study established that change management has a significant and positive effect on the productivity of banks in the Nigerian city of Owerri. The study recommended that managers should be encouraged to communicate clearly and effectively with all stakeholders especially when the firm is undergoing corporate restructuring or when the business process is redefined to enable them to see the need for change and to fully embrace it. The study also recommends that the leaders in organizations should train the members of their organizations through counselling, coaching and other forms of support to properly adapt to the desired changes in the organization.

Kimutai (2017) sought to establish the strategies of change management and the organizational effectiveness. The study was guided by a number of objectives: to assess the extent to which an increase in automation impacts the effectiveness of an organization, to establish how developing capacity affects the organizational effectiveness and to assess how the engagement of stakeholders affects organizational effectiveness. The study employed a descriptive approach and had a target population of 78 senior staff members at the University of Eldoret. Stratified random sampling was used to obtain a sample size of 65 senior employees. These senior staff members were directly involved in managing change in the organization. Primary data was collected using questionnaires that were categorized according to the themes of change management strategies and organizational effectiveness in line with the study. The collected data was processed and analyzed using Statistical Package for Social Sciences (SPSS). The quantitative data was analyzed using descriptive statistics such as the mean, mode, median and frequencies. Inferential statistics were done through the Pearson

correlation analysis and regression analysis. The results were presented in form of charts and tables for quantitative data and in prose for qualitative data. The study concluded that there was a significant relationship between automation of the office and the effectiveness of the organization. Additionally, the study found that there was a significant relationship between development of staff and organizational effectiveness at the University of Eldoret. This influences that further training of staff and students through scholarships and awards by influencing the effectiveness of the university. The study also concluded that there was a positive and significant relationship between the engagement and stakeholders and organizational effectiveness in the University of Eldoret. The study recommended that there was a need to automate all the university activities since automation has a positive influence on organizational effectiveness. There is also a need for the University of Eldoret to provide more scholarships and awards to its staff and students to positively influence effectiveness at the University of Eldoret.

Koitie (2015) sought to establish the influence of strategic change management practices on the performance of Constitutional Commissions in Kenya. The study was based on the fact that in the present day, organizational change is an ever-present feature both at a strategic and at an operational level. As a result, organizations must have a clear vision of what they want to become in the future but also how they will deal with the changes that arise in their quest to do so. The success or failure of strategic change is dependent on the ability of the organization to implement new processes and structures as well as on the ability of the organization to communicate the new mission to all the stakeholders. The study used a cross sectional survey design where the 10 constitutional commissions were the sample frame. The main instrument of data collection used was a questionnaire where questionnaires were administered to the 10 commissions. The study found that all of the constitutional commissions were conducting strategic changes to organize their strategies in a way that helps them achieve the demands of all stakeholders and maximize the resources and activities of the organization. An effective internal communication system corresponding to every stage of the change strategy was found to be a key part of effective application of strategic change. Participation of employees, involvement of all stakeholders and a management that develops the appropriate systems and harmonious

working environment with other employees during the process were also found to be important components of effective implementation of strategic change in an organization.

The findings of the study affirm the notion that effective strategic change has a positive influence on the performance of constitutional commissions. The study found that the commissions faced a number of challenges in implementing strategic change. Such challenges included inadequate training resources, incompatibility of the process of change management with the structure of the organization and ineffective enforcement of change management by leaders. The study recommended that organizational leaders should have a long-term view on the performance of the commissions when implementing the change as opposed to a short term outlook. Due to the limitation in its scope, the study cannot be used as a general reference. The study recommended future researchers should use a mixed method research strategy that applies a longitudinal study to better understand the relationship.

According to Shahzad and Abdulai (2020), extreme weather as a result of climate change poses a great threat to a lot of farmers around the world. The paper sought to analyze the adaptation of farmers to extreme weather through climate smart farm practices (CSFP). The study also sought to establish the effect of these adaptation strategies on the performance of the farmers. The study used recent data from farms in the agro-ecological regions of Pakistan. A majority of the previous studies in Pakistan employed methods that did not consider unobserved attributes like innate skills and risk preferences. This leads to inconsistencies in the estimates. This study used a regression model that allowed for any potential endogeneity and selection bias as a result of observable and unobservable factors. Empirical results revealed that the adoption of CSFP practices led to an increase in the amount of farm returns. The findings also showed that adoption of CSFP practices also results in a significant reduction of volatility of the net returns of the farm and the exposure of the farmers to downside risk or ruin. The study further established that access to extension services as well as the education levels of the members of the household positively affected the probability of the farmers adopting CSFP as a response to extreme weather conditions.

Makanga (2019) conducted a study to examine how the library leadership initiate and manage change at the Technical University of Kenya (TUK) so they can the expectations of all the users and to get support from donors and the parent organization. The research study had a number of objectives including: To identify the role of the librarian in change management, to identify the change management program used at the library of Technical University of Kenya and to establish the forces driving and inhibiting forces for and against change, to establish the strategies and processes adopted by the Librarian of the University in managing change. The study used Kurt Lewin's theory of change management and used the case study research design. The study's target population was thirty (30) staff members from the university excluding the subordinate staff at the university. The study used systematic random sampling to get a sample size of 28 respondents. The main instruments used to collect data in the study were questionnaires and interview schedules. The collected data was analyzed using descriptive statistics with the help of Statistical Package for Social Sciences (SPSS). The interview schedule was broken down and explained in prose form. The study established that the leadership of TUK Library was committed to embracing change and had developed a strategic plan for the library that involved the library staff in change management. The study also found that developments in Information technology, the changing economy as well as change in the educational and learning environment had an effect on the change at TUK library. The TUK Library applied Library of Congress (LCC), Dewey Decimal Classification (DDC) and the KOHA library management system. Staff training and capacity development also took place as a way of change management at TUK Library. The study recommended that a staff training program, succession plan and further research on strategies of change management. The findings of the study inform TUK Library and other libraries in academic institutions on the formation of policies and will contribute to the existing literature on change management.

Simiyu (2018) conducted a study to investigate the effect of practices of project management on the performance of agricultural projects by community based organizations in Kenya's Bungoma County. This study was guided by a number of objectives: to determine the effects of project planning, project communication, project implementation, monitoring and evaluation on the performance of agricultural projects in

Bungoma. The study also evaluated the moderating role of environmental factors on the relationship between the project management practices and the performance of agricultural projects. The study was informed by a number of theories. The study used descriptive and explanatory research designs to collect data. The study's target population was 138 community project groups in Bungoma County. The study used stratified sampling to choose 61 project groups from the target population. Questionnaires were the main interview used to collect the primary data. Interviews were used as well on 15 field officers. Descriptive statistics such as frequency, mean, percentages and standard deviation were used to study the variables. Multiple regression models were applied to examine the relationships between the variables. The analysis was conducted through Statistical Package for Social Services (SPSS). The qualitative data was analyzed using content analysis. The results showed that all of the variables including project planning, project implementation, M&E and communication was significant on the performance of the project performance. The environmental enablers as a moderating value were established to have an influence on the relationship between the practices of performance and project performance. The study recommended that for project performance to improve, governments should ensure proper planning, implementation, monitoring and evaluation and communication methods. The study further recommended that management of agricultural projects should include farmers and local leaders rather than office planning officers only.

Karimi (2019) study sought to examine strategies of change management and the productivity of employees with the county government of Meru being the focus of the study. The study objectives were to establish alternative discipline interventions at work, organizational culture and issuing of incentives. The study was guided by 2 theories, the reinforcement and behavior modification theory and Mc Kinsey 7's model. A descriptive survey research design was employed in the study. The target population in the study was 490 employees from the revenue water and irrigation and the health services departments. Stratified and simple random sampling techniques were applied to select the final sample. Questionnaires were the main instruments used to collect data in the study. The collected data was analyzed through the measures of central tendency such as the mean and variance. A multiple regression model was applied to establish the relationship between

the variables in the study. Inferential statistics was undertaken using Statistical Package for Social Sciences (SPSS). The findings of the study imply that there was a positively significant relationship between alternative work discipline interventions, provision of incentives, organizational culture and the productivity of the employees of the Meru County Government. As such, the study concluded that strategies of change management are crucial in the productivity of employees within the organization. Based on these findings, the study recommended that alternative work discipline remedies/interventions, organizational culture and issuing of incentives should be effected into the public system to smoothen the strategies of change management and consequently the productivity of employees.

Kimhi and Oliel (2019) conducted a study to examine change management and organizational performance among a number of manufacturing companies in Nigeria's Anambra State. The study reviewed relative empirical, theoretical and conceptual literature. The study was based on organizational change and Lewin's Three Step Model. The study employed a descriptive survey design and used primary data. The target population of the study was 286 employees working in the companies selected for the study. All companies were manufacturing companies in Anambra state. The whole population formed the sample size used in the study. Data was mainly collected through the use of a questionnaire. Content validity was used as well as the test-retest method to ascertain the research instrument's validity. The study established that changes in technology have a positive and significant influence on the performance of manufacturing companies. Strategies of change management also have a positive and significant influence on the performance of organizations in the case of manufacturing companies in Anambra state. The study further found that changes in leadership have a positive and significant effect on organizational performance in the manufacturing companies of Anambra State. The study concluded that change management has a positive and significant effect on the organizational performance of manufacturing companies in Anambra State. Based on the findings, the study recommends that technology change should be embraced since it makes work easier for employees and makes operations in the organization more efficient. As for the organizations that have implemented or acquired new technology, the study recommends that employees are

provided with proper training to maximize their performances. In addition, the study recommends that organizations should create robust strategies of organizational management in order to build good relationships in line with the norms, values, perceptions and behaviours of the organization. Since leadership changes the mindset, behaviour and style of leaders, the processes of change they create must encourage employees to want to be a part of the process by choice rather than by force.

Kang (2015) sought to understand the concept of change management and described it in two ways based on the attributes, the definition of the change management, the target, focus group and the roles of the agents of change in question. The study defined change management as being either macro change management or micro change management. Macro change management was found to be needed when vast changes happened in an organization. This change could be internal, external or a combination of both. Mergers with other organizations can be an example of macro change management in an organization. Macro change management usually targets the general direction of the organization, the structures, the processes followed and the capabilities of the organization as a whole. Such changes can also be applied to small organizations or smaller divisions within an organization regardless of the size. As for micro change management it focuses more on a component of the process of implementing the new change. It ensures that the new interventions help to achieve the desired results. This includes the management and guidance of the specific components and the processes they are involved in. It is important for change management to be well defined and clearly understood by all stakeholders so that those affected within the organization are able to adapt and effect the required changes in their roles in the organization.

Harrison (2017) sought to examine the role of data in changing management practices for the improvement of farm performance and consequently farm sustainability. Farmers can work with data on multiple levels. Some of the data is generalized such as newsletter articles and best management practices while others are personalized e.g. farm soil tests, farm assessments and billing records. The study posited that the more personal data, the more the improvement of the management strategies employed in the farms. This in turn alters how farmers look at the long term sustainability of their farms and make decisions

based on the data to improve the sustainability. The study assessed how well informed the farmers were about the strengths and weaknesses of their firms regarding the sustainability. The study found that when farmers engage in data like billing and production records, they are more likely to examine their sustainability on a more objective level. This was established for soil use, materials used, quality of life, economic viability and environmental conservation. The study further established that when data was neglected or did not exist altogether, they were more likely to overestimate their sustainability and this was seen in themes such as energy, climate, water usage, biodiversity and work conditions. Farmers however seemed to consistently underestimate their sustainability in animal husbandry.

Irungu (2017) conducted a study to examine the change management practices adopted by Equity Bank. Change is difficult and inevitable due to the unpredictable nature of the current business environment. The need for change management has increased significantly among organizations in the last half century. Firms that want to stay competitive and survive change must adopt the right change management processes. Change is constant in organizational life and the ability to smoothly manage change is a key feature of successful organizations. Change management is the right application of knowledge, tools and the resources available at one's disposal to harness the benefits of change. The study was informed by the Resource Based View Theory and Kurt Lewin's change model. The study adopted a case study as well as an interview guide to collect data. The collected data was organized and further analyzed using content analysis. The study found that Equity Bank institutes and uses multiple change management practices. The study recommends that Equity Bank should set up a strategy of flexible organizational structure so that all departments are linked and can enhance rapid decision making and promotes delegation within the organization. The study also recommended that the bank pay attention to the activities and the aspects of the employees that can promote their appreciation or motivation to embrace change.

Kipsha and Koech (2020) conducted a study to assess the effects of strategic change management on the productivity of government owned entities. The objectives of the study were to establish the effect of strategic change in leadership, culture, corporate

communication and allocation of resources on the performance of government owned entities in Mombasa County. The scope of the study was the 47 entities owned by the government in Mombasa County and the target population was 141 managers including senior managers, department heads and line managers. The data was analyzed using Statistical Package for Social Science (SPSS) software. The results of the study indicated that a significant number of government owned entities were led by strategic leaders who motivated the employees towards achieving the goals of the organization. The study also revealed that there was strong cultural integration in the parastatals and that the employees from different departments all shared a similar perspective. A majority of the parastatals had strong corporate communication thus helping the organizations to run smoothly and successfully. The study therefore posited that strategic leadership change, strategic corporate communication change, strategic cultural integration change, as well as strategic resource allocation change had a positive impact on the productivity of government owned entities in the county of Mombasa.

According to Pugh (2016), change management involves a number of skills in dealing with people. These skills include budgeting, planning, communication, leadership, team-building and others. However, the most important interpersonal skill when it comes to effecting meaningful change in an organization is trust. The ability to establish and invoke trust is therefore important. Trust exists in the networks and connections within the organization and can be either formal or informal in nature. A manager should not only be self-aware with regards to his strength and weaknesses but should be able to view themselves from other people's points of view. Pugh also posits that changes in labels do not necessarily transform work units into teams. Centralized work unites tend to suffer from poor execution, too many layers in the organizational structure, inconsistency and resistance to change. Team based organizations can help to streamline such issues by improving the individuals and the collective simultaneously in the organization.

Musau (2012) conducted a research study to examine the management of strategic change at Safaricom Limited. Safaricom is a leading telecommunication company in the region, with close to 20 million subscribers. The company has gone through many strategic and operational changes in the past to improve its efficiency and effectiveness resulting in

unparalleled competitive advantage. Study objectives were identified to establish the approach to be used by Safaricom to manage challenges faced when managing change. One study conducted through interviews in different departments of the company yielded responses for analysis. The study established that Safaricom Limited had experienced some strategic changes and applied change management practices to effect competitive advantage (Musau, 2012).

Mukhebi (2019) conducted a study to investigate the effect of change management on the performance of employees in commercial banks in Kenya's Trans Nzoia County. The study was conducted on the backdrop of increased market pressure and market regulations that had prompted commercial banks to enforce drastic changes in their organizations so as to remain competitive. The process of managing change comes with multiple challengers that should be dealt with appropriately if the organization is to achieve their desired objectives. The study was guided by the following four objectives: examine the effect of a change in technology on employee performance; examine the effect of downsizing on employee performance; determine the influence of a change in structure on employee performance and examine the influence of organizational culture on employee performance in commercial banks in Trans Nzoia County. The study was guided by a number of theories including the Uncertainty Management Theory, McKinsey 7-S Change, Lewin' Change Management and Management Models. The existing empirical and theoretical literature was reviewed in line with the objectives of the study. A descriptive survey research design was employed in the study. The target population of the study was 470 employees from 14 commercial banks located within Trans Nzoia County. The findings of the analysis indicated that technological change, downsizing, structural change and organizational culture all have significant effect on the performance of employees in commercial banks. As such, the study concluded that change management had a significant effect on the performance of employees in the commercial banks in Trans Nzoia County. The study recommended that the management of the banks undergoing organizational change should emphasize on strategies of communication and participatory leadership in order to make the employees ready for change. The study further recommended that commercial banks should aim to become

learning organization and to promote a change of attitudes so as to support organizational change management.

2.2.2 Change Management, Situational Leadership and Sugarcane Productivity.

Ghazzawi, Shoughari and Osta (2017) looked at the situational leadership and its effectiveness in rising employee productivity. Structured questionnaires were used to collect data which were quantitative in nature. Stepwise regression was performed using SPSS. The findings revealed a positive relationship between situational leadership and employee productivity. However, the study considered the situational leadership as an independent variable. The current study will consider the situational leadership as a moderating variable on the relationship between change management and sugarcane productivity.

Raza and Sikandar (2018) using Hersey and Blanchard Situational Model examined the relationship between leadership style and students' performance. Readiness level scale was used to collect data. The study used experimental research design. The analysis involved both inferential and descriptive statistics. The study results reported significant influence of situational approach on students' performance. The situational approach had a strong positive a statistically significant effect on students' performance. The study however used experimental research design to assess the relationship between the study variables. This study used cross sectional research design.

Ruslan, Lian and Fitria (2020) examined the relationship between principal's situational leadership and teacher's professionalism and performance. The study used questionnaires to collect primary data. Secondary data was collected from various documentation. Data was analysed using SPSS. The study results showed a statistically significant relationship between principal's situational leadership and teacher's performance. The findings also revealed that there is significant relationship between teacher's professionalism and teacher's performance.

Ridlwan, Purwandari and Syah (2021) analysed the effect of situational leadership and organizational culture on employee productivity with job satisfaction as an intervening variable. The study employed Structural Equation Modeling analysis using a sample of

275 employees of fire management and rescue of the North Jakarta administration. The data were analyzed using Lisrel software. The results showed that situational leadership and organizational culture did not have a significant relationship with productivity directly. Situational leadership and organizational culture had a positive and significant effect on job satisfaction, while job satisfaction had a positive and significant effect on employee productivity. It is suggested that the organization needs to pay attention to job satisfaction which is a significant factor in improving employee productivity.

Mansour and Elziny (2020) assessed the impact of situational leadership style on enhancing employee productivity in quick service restaurants. The results of this study revealed that QSRs' employees working in Greater Cairo are affected by their managers' conduct of situational leadership. Consistent to these findings, QSRs' managers have to improve their relationship behavior with their subordinates; also, they should understand how high task behaviour will influence them to mature in their performance and how effective the manager was in using situational leadership style.

Rahadiyan, Triatmanto and Respati (2019) examined the effect situational leadership style towards employee productivity through work satisfaction. The research design used is associative research which aims to find out the relationship between two variables or more, with a function to explain, a symptom in the study using a quantitative correlation approach with the explanatory survey method. The population in this study were all employees and leaders in the development companies in East Java Province - Indonesia, the sampling technique was done by proportional random sampling. The data analysis technique uses a Structural Equation Model better known as SEM (Structural Equation Modeling) so that testing can be done to determine the value between exogenous and endogenous variables. The results showed that Situational motivation and leadership style had an effect on productivity through job satisfaction, which meant that the better job satisfaction in the company provided more optimal performance, supported by the right motivation and good situational leadership to generate job satisfaction.

Ghazzawi, Shoughari and Osta (2017) studied situational leadership and its effectiveness in rising employee productivity. A quantitative data collection approaches was used in

order to study the relationship between both of these variables. Data collected was analyzed using SPSS through factor reduction technique in order to unveil the relationship between situational leadership and employee productivity. As a second step analysis in this research paper, regression equation is generated to find how change in one or more factor affects the other one(s). A positive relationship was found between situational leadership and employee productivity, therefore the studied hypotheses were accepted.

Kitonga (2017) studied situational leadership and productivity of not-for-profit organizations in Nairobi County. The study used convergent mixed method research design. The study target population was 1475 not-for-profit organizations operating in Nairobi County. The study sample size was 305 Situational leaders from not-for-profit organizations operating in Nairobi County. The study was confined to not-for-profit organizations operating in Nairobi County in Kenya. The study established that there is significant positive correlation between Situational leadership practices in general and productivity in not-for-profit organizations. Specifically, the study findings established positive correlations between determining strategic direction, developing human capital, ethical practices, strategic control and productivity.

Nanthagopan (2016) studied the impact of situational leadership and management capability on organizational productivity of NGOs. Stratified random sampling technique and primary data collections methods were used to conduct the study. Exploratory Factor Analysis Technique has been used to reduce the variables and regression analysis has been used to compare the variables. The results show that, leadership and management capability are accounted for coefficient for determination with organizational productivity of Local NGOs and international NGOs. Leadership of Local NGOs had a considerably stronger positive relationship on organizational productivity compared with Situational leadership of International NGOs. When the study compared the Situational leadership and management capability of NGOs, management capability is was the comparably significant factor in influencing the organizational productivity. Management capability is of high importance than Situational leadership for international NGOs. Both capacities are averagely high importance to Local NGOs.

Momanyi and Juma (2015) conducted a study on effect of situational leadership style on employee productivity of Kenya parastatals. The study adopted descriptive survey research design and data was collected through well designed questionnaires and was analyzed using descriptive and inferential statistics. The study found out that Situational leadership involvement had a positive influence on employee productivity in the energy sector parastatals in Kenya. The study also established that leaders working as a team with other staff in the organization are likely to execute their organizational strategies successfully and free flow of all communication between employees in the organization can help in the execution of strategy successfully and lastly motivation of employees helps to achieve successful implementation of the strategy.

Okoji (2014) studied the influence of leadership styles on community development program implementation in rural communities. The study adopted descriptive survey research of the ex post facto type. Purposive random sampling technique was used to select the state while stratified random sampling technique was used to select the local governments used for the study. Stratified random sampling technique was used to stratify the local government selected into stratum, simple random sampling technique was used to select the 179 respondents. The (CLPS) inventory and Community Members Assessment of Leaders Scale were used. Two hypotheses were answered and tested at 0.05 level of significance. Data was analysed using descriptive and Pearson's product moment correlation. The result of the influence of leadership styles on community development programmes implementation in rural communities was mostly influenced by Situational leadership style. The study emphasized that there is the need for proper dissemination of information from the rulers to the followers, through documentation and dissemination of information, the followers can share the best practices and learn from each other.

Opoku, Ahmed and Cruickshank (2015) conducted a study on Situational leadership of organizational productivity. The purpose of this paper was to investigate if there is any particular Situational leadership associated with intra-organizational leaders within UK construction organizations charged with the promotion of sustainability practices. The study examined the effective Situational leadership style of productivity professionals

responsible for developing sustainable construction strategies. The results showed that while there is no one best leadership style for all situation, most leaders charged with the role of promoting sustainable construction are strategic in their style or behavior. The study asserts that leadership is a significant success factor in promoting productivity in the construction industry. Productivity is an integral part of the construction industry and affects all aspects of construction business operations. The findings was a guide organizational leaders with the responsibility of promoting productivity.

Mbugua, Nyiva and Gathano (2017) conducted a study on leadership and employee productivity of community based projects in Archdiocese of Nairobi. The general objective of the study is to assess factors affecting employee productivity of community based projects with reference to Catholic Archdiocese of Nairobi in Kenya. The study established that though the top management is an important aspect, its support for employee productivity of various resources allocation is weak and almost non-existent in many projects. The leaders should create an environment where all users feel part of the team that run projects. The study asserted that sources of finances be made known to create accountability and transparency. This would enable stakeholders to feel that there is top management support to employee productivity.

Dumas and Beinecke (2018) sought to extend the knowledge regarding the interactions of vertical and shared leadership in projects involving change management. The study employed qualitative content analysis based on interviews with top and mid-level managers as well as a set of data that includes corporate reports. An analysis of books and presentations was carried out and it analyze the relationships between the two forms of leadership. This was done through directive, transformational, transactional and behaviors of empowerment. The study found that vertical and shared leadership both have a need to deal with change. Leadership behaviours complement each other to meet the demands of the project. The study recommended that leaders be developed and trained to equip them with numerous effective leadership skills so that they can apply the necessary ones in the right contexts.

According to Njeri (2017), leadership skills undeniably have an effect on the performance of organizations across the world. Strategic leadership practices specifically have been seen to enhance efficient and effective performance of organizations in the dynamic and highly volatile business environment conducted a study to determine the effects of strategic leadership on the performance of coffee cooperative societies in Kenya's Nyeri County. Specifically, the study sought to determine visionary, transformational, situational and transactional leadership on the performance of the said coffee cooperative societies in Nyeri. 63.1% of the performance of the cooperative societies was found to be as a result of strategic leadership at a confidence level of 95%. The beta value in the derived models indicated that a unit change in visionary leadership led to a 45% change in the performance of coffee cooperatives. Similarly, a unit change in situational leadership led to a change of 25.8% of the performance of cooperative societies. The study established that the most important determinant in the performance of cooperative societies was visionary leadership followed by transformational leadership, situational leadership and transactional leadership in that order. Based on these findings, the study recommended that the management of cooperative societies should communicate the important decisions as often as they can to the stakeholders of the coffee sector and try to involve them in making decisions.

Alsaqqa (2020) sought to address the benefit of situational leadership in dealing with the context of healthcare organizations. This is because the healthcare industry over the past two decades has been unpredictable. This state of uncertainty was as a result of change in managed care, increased demand for quality care by clients and the expensive costs of new medical technology. These changes in the environmental factors have led to the development of new strategies by healthcare organizations and healthcare managers. Leaders in health organizations face a variety of challengers and responsibilities in their daily operations most commonly staff relations, continuous change and their ability to meet the targets of the organization. As such, situational leadership needs one to create collaboration within the organization by pooling the knowledge of all staff together, defining the discussions to be held and to ask critical questions. The study concluded that leaders should be equipped with situational leadership skills for the enhancement of healthcare in health organizations.

Kung'u (2019) conducted a study to examine the leadership styles on change management among county governments with the moderating variable for the study being organization culture. The study used the following research variables; to find the effect of transformational leadership, autocratic leadership, laissez faire leadership, and democratic leadership on change management in Kenyan county governments. The findings of the study would be of use to the civil society, county government managers and future scholars studying the same concepts. The study employed a descriptive research design. The study was guided by a number of theories in its aim of explaining the relationship between the independent and dependent variables. These theories include Behavioural Theory, Fiedler's Contingency Theory, Leader Member exchange theory (LMX) theory, Path-Goal Leadership Theory, Blanchard's Situational Theory and the Great Man and Trait Theories. The target population for the research study included county executives, county chief officers and members of the county assembly. The findings of the study were presented as frequencies, bar graphs, pie charts, percentages and tables.

The study established that there was a positive and significant correlation between transformational leadership and change management as shown by an r-value of 0.581. The study also showed a positive relationship between transactional leadership and change management as shown by the r-value of 0.463. The study found that there was a negative correlation between laissez-faire leadership and change management with an r-value of -0.286. There also existed a positive and significant association between autocratic leadership and change management at 0.699. Finally, an r-value of 0.549 shows that there was a positive correlation between democratic leadership and change management. Regression Analysis of the data established that $R=0.790$ and $R^2=0.624$. This implies that 62.4% of all the changes in Change management which was the dependent variable can be attributed to the independent variables. The remaining 37.6% was as a result of other factors that were not captured in the research study. The study concluded that transformational leadership had a significant effect on change management in Kenyan county governments. The study also concluded that transactional leadership had a significant effect on change management in County governments in Kenya. Further, the study concluded that laissez-faire leadership had an effect on change

management in Kenyan counties and that autocratic leadership had an impact on the change management of Kenyan counties.

Meier (2016) established that leadership sciences could be used to develop the theories of situational leadership in a way that allows for a blended learning setting. With the rise of computer technology, teaching has employed blended learning. As technology continues to change, it challenges lecturers as well as teachers. Most studies about blended learning have focused on the practical aspect and mainly used theoretical concepts. This study views situational leadership as a framework for blended learning. The study presented a model that employed blended learning and presented the right teaching methods for specific learning targets.

Akinbode and Al Shuhumi (2018) discussed change management and different styles of leadership. Given how volatile uncertain and ambiguous today's world is, organizations could be exposed by the constant change. In order to survive, organizations or institutions must be able to adapt positively to such changes. To successfully initiate and implement change initiatives, organizational leaders especially those in institutions of higher learning are required to be diligent and skilful in their activities. Data from previous studies indicated that seventy percent of all initiatives regarding change fail and this has mainly been as a result of the leaders' inability to anchor such programs effectively. Results from previous cases studies reveal that a failure to institutionalize change initiatives in a gradual manner as well as inappropriate styles of leadership were partly responsible for the failure of change initiatives especially in Higher Education Institutions (HEIs). The paper recommended that institutions of higher learning turn to learning organizations and adopt the transformational style of leadership if the change management process is to be effective. The leaders of these institutions need to begin a series of change programmes to be in touch with the developments of the modern world. The adoption of these change initiatives will enable them to meet the needs of society and stay relevant in the industry. The study recommends that the change process should be carried out diligently and follow the necessary preliminary tasks to increase the chances of success. The study concluded that whether change initiatives succeed or fail is

dependent on how well the leaders made preparations for themselves and the institutions as a whole in readiness for change.

Wright, Gardner and Moynihan (2017) presented dialogic methods that may be employed by situational leaders to bring about the desired change and result in the outcomes they seek. Leaders often find themselves in different situations that may require different responses. Choosing the right style of leadership for each situation may be difficult and as a result, it is crucial that leaders come up with remedies that involve co-participation and mutual constitution. These dialogical methods involve developing mentorship skills, decision-making skills, coaching skills and social skills. Since the situational style of leadership has become very popular with globalization, leaders and organizations should be made aware of the advantages and potential disadvantages of the system. Further skills will allow leaders to gauge how ready their followers are to adapt to new changes and will enable them to enhance dialogue between the involved stakeholders.

Lynch, Mayberry and Omer (2015) found that leaders must use different methods to get their followers to complete their objectives depending on their capabilities and readiness. When employees are confident and are willing to perform these tasks, then the best way to get them to do them is by selling i.e. by encouraging them. Other employees typically require high support and little guidance. These are followers who have the skill and capacity to do these tasks but are probably insecure or are unwilling. The best way to deal with such cases is by participating with them as this makes them more confident. Finally, some followers are either unable or unwilling and insecure about a task, the best way to deal with such employees is by telling and instructing them to carry them out. The study concludes that a change in the performance level of an employee results in a change in the leadership behavior shown by the situational leader.

Wuryani, Rodlib, Sutarsib, Dewib and Arifb (2021) sought to investigate the effect of situational leadership on the work motivation of employees and consequently of employee performance through a decision support system. The study employed the use of quantitative research to obtain the relevant data. Data analysis was carried out using

smart PLS. The results of the study established that the decision support system (DSS) in situational leadership did not contribute to the improvement of employee performance. The study concluded that the role played by technology in a semi-structured decision making process must be guided by sufficient data so as to improve the levels of motivation and performance of the employees in the organization. Leaders often make unstructured decisions without consulting the data stored in such systems. As a result, the study was not as accurate as expected since the performance indicators were not adhered to in the decision making process.

Kavanagh and Ashkanasy (2016) sought to establish the impact of leadership and strategy of change management on organizational culture. The research reported a longitudinal study that assessed mergers between three public sector organizations. The study employed the use of both qualitative and quantitative analysis methods to examine the influence of leadership and change management. The findings from the study indicate that in a lot of cases, the changes caused by mergers are imposed on the leaders and the process of reinventing the organizational culture is often hindered by the speed with which such changes occur. As a result, the success or failure of any organizational mergers is dependent on personal perceptions regarding the handling of the change process as well as the direction in which the culture is moving. It is important that there is communication between all stakeholders and that the process is transparent to all since this often decides how a leader is perceived and who is perceived as a leader in the first place. Leaders should show competence and consistency in the process of effecting change so that the employees within the organization accept the changes set out by the merger.

Belias and Koustelios (2014) presented the effect of leadership and change management strategy on organizational culture. The study presented the notion of culture and defined organizational culture. The study examined organizational culture and defined the role of a leader. The paper agreed with the notion that strategic leadership should be transformational in order to make a difference in the organization. The study also assessed the notion of change and established that changing the culture of an organization is a large operation and all the organizational tools need to be put in place if it is to be get

the desired results. To be able to effect positive change, one must be very concise and clear about what exactly they need to change and to what effect they are making the said changes. The findings of the study imply that leadership is closely linked to organizational culture mainly through the processes of outlining a certain vision and setting out the expectations. This paper provided an explorative and theoretical reference through a bibliography that can be used to guide further research.

Mustofa and Muafi (2021) sought to examine and analyze the effect of situational leadership on the performance of employees by the job satisfaction and organizational citizenship behavior of the employees. The study used quantitative research methods based on empirical rational principles. A questionnaire was used to collect the data of 44 respondents. The data was analyzed using Smart PLS software. The results of the study showed that situational leadership had a significant and positive effect on the job satisfaction of employees. Situational leadership also had a positive and significant impact on the Islamic organizational citizenship behaviour of the employee. The study also found that situational leadership has no effect on employee performance and that situational leadership has a positive and significant influence on the employee performance. Situational leadership was found to have a positive and significant influence on employee performance and finally, situational leadership was found to have a positive and significant effect on the performance of employees mediated by job satisfaction and Islamic organizational citizenship behaviour.

Wanza and Nkuraru (2016) conducted a study to investigate the effects of change management on employee performance in the University of Eldoret. The changes focused on in this study were technological changes, organizational leadership, structure and culture. The study used case study research method. The target population of the study was 403 employees. From this population, the random sampling techniques was used to select a sample size of 121 employees. Questionnaires and interview schedules were used to collect primary data and the data was analyzed using descriptive statistics and presented using tables and graphs. The findings of the study indicate that structural changes and organizational leadership positively influence the performance of employees. The study also revealed that technological changes have a large effect on the

performance of employees as a result of the rapid changes in technology that eases the work load of employees and improves the efficiency and effectiveness within the organization. A strong organizational culture encourages teamwork and enhances the performance of employees. This results in improved synergy and momentum towards achieving the objectives of the organization. The study made the conclusion that structural changes, technology, leadership and organizational culture all positively influence employee performance. The study recommended that the university leadership needed to employ change management techniques that improve motivation levels among the employees so that they can meet and exceed targets. The leadership should also adopt a result oriented process therefore enhancing the performance of the employees.

Kinoti (2015) conducted a study to investigate the effects of change management on the performance of employees at the Co-operative Bank of Kenya. The study applied case study research design mainly because case study research design enables the researcher to answer questions like “how” and “why”. This allows the study to fully understand the complex nature of the processes involved in change management of banks. The study conducted in-depth interviews on head of departments charged with implementing change at the head office. The main departments were; Operations, Information Technology, Human Resource, Marketing and Finance. The findings were presented qualitatively meaning that emphasis was placed on the entities, processes and meanings rather than in terms of quantity, frequency, intensity and amount. The study established that the manner in which a leader makes decisions, delegates responsibility to other staff and interacts with other employees has an effect on the organization as a whole. The study further showed that by embracing and adopting new technology, the performance of employees had significantly improved. The study concluded that the type of leadership used at Co-operative Bank of Kenya was an autocracy that allowed for some democracy. Senior management sought the opinion of employees but ultimately made the final decision themselves. Additionally, changes in the structure of the organization enhanced the performance of employees. This is as a result of effective supervisory relationships that boosted the work flow and in turn resulted in improved productivity. Guided by the findings, the study recommended that management should begin to create awareness on new developments regarding how their products and services are delivered among their

target markets. The study also posited that the organization should orientate the employees on new developments in the relevant technology. This can be achieved through in-house training as well as organizing and conducting open forums among the organizations' employees, customers and stakeholders.

Wachira and Anyieni (2017) sought to establish the influence of change management on the performance of the Teachers Service Commission (TSC) in Kenya. It was based on the changing nature of the organization's environment and the need for change management practices to be responsive and adaptive to these changes. The main objective of the study was to examine the effect of communication on the performance of the TSC in Kenya. The study used descriptive research design on the target population which included the directors, senior deputy directors, deputy directors, county directors and human resource officers. A sample size of 80 respondents was used in the study. The study used a questionnaire as the main instrument of collecting data. The data was analyzed using statistical package for social sciences (SPSS). The data was presented through descriptive and inferential statistics. Descriptive statistic involves measures of central tendency such as mean and standard deviation. The findings of the study were presented through tables and discussions. The research study concluded that communication had a positive effect on the performance of the Teachers Service Commission. The study further concluded that communication had a significant influence on TSC performance and made recommendation that the TSC should establish better systems of communication within its organizational structure to enhance communication and consequently improve performance.

Aksu (2014) sought to examine situational leadership among different generations. The study found that companies utilize only a third of their human resource in the best case scenario. It is observed that the team leading the changes generally consist of individuals who are committed to their work. Given that this is often a low percentage of the entire staff, this results in a slow adaptation of the change in the organization. The workforce revealed that the percentage of individual fully committed to their jobs was 27% in the United States of America which was the highest percentage and 6% in Singapore which had the lowest percentage. These results show that the leaders have a lot of work with

regards to effecting change or improving the commitment of employees to their jobs. The literature review in the study implied that an appropriate style of leadership can successfully implement what is needed. The study acknowledges that there are four generations with varying characteristics that are present in the same workplace. The four generations are the silent generation, baby boomers, Generation X and Generation Y. The paper presented the direction of persons with different behavioural traits would take based on their generational differences and during the process of change in the organization. This made the process of change faster and more productive. The study posited that the implementation of Hersey-Blanchard Situational Leadership behaviour as it could have a big impact.

Francisco and Nuqui (2020) studied the emergence of situational leadership during the Covid-19 pandemic among school administrators in the Philippines. This situational leadership was called new normal leadership. The target of the study was a number of school administrators in the Bulacan province of the Philippines during the 2020-2021 school year. The study employed a qualitative research design aimed at describing the experiences of people in a certain condition or phenomenon. The study used codes, transcriptions and triangulations to extract themes from the data collected. The findings of the study through data analysis revealed that new normal leadership can be described as the capacity to adapt while maintaining the same commitment and that new normal leadership entails being an instructional decision maker. Thirdly, the new normal leadership is about a leader who can plan well, is vigilant and initiates change. The study recommended that this theory be tested further through the quantitative approach to make confirmations and carry out examinations in more depth.

2.2.3 Change Management, Farmer Characteristics and Sugarcane Productivity

Nkari and Kibera (2016) looked at the relationship between farmer characteristics and performance. Primary data was collected using semi-structured questionnaires. Inferential and descriptive statistics were used in the analysis. The study findings revealed significant relationship between farmer characteristics and performance. However, the study used farmer characteristics as an independent variable rather than a mediating variable. The study also failed to introduce the moderating and mediating variable. The

current study introduced the moderating and mediating variable to assess the relationship between change management and productivity.

The farmer characters proposed for this study are generational demographic type and unique. The generational demographic characteristics are found at a work place such as a sugarcane farm: Veterans (born, 1922-1943), Baby-Boomers (1944-1960), Xers (1961-1980) and Nexters (born 1981-2000) (Arsenault, 2004). Their cane farming mediation action was determined by their farming contract pegged to the current sugar sub sector regulations. Yield enhancing characteristics will influence cane farming practice on sugarcane productivity (Wanyonyi, 2016).

Guo, Wen and Zhu (2015) assessed the impact of aging agricultural labor population on farmland output: from the perspective of farmer characteristics. The results showed that, in this context of aging, changes in the working-age households have a significant impact on agricultural output. Despite the fact that the impacts of intention to abandon land management were not significant, we can ignore this preference in the workforce. The combination of changes in the composition of the working-age households indicates that 58.53 percent of the agricultural producers will likely quit. This is a potential threat for the future of agricultural development. The study also found that elderly farmers who do not intend to abandon farming had higher agricultural output compared to other farmers. This indicates that the adverse effects of changes in the agricultural population age result more from the agricultural output of older farmers who intend to give up farming. This intention adversely affected other elements and reduced investment. Therefore, various forms of training should increase efforts to cultivate modern professional farmers and policies should be simultaneously developed to increase agricultural production levels.

Kassem and Sarhan (2013) studied the effect of job characteristics on satisfaction and Productivity. The study tested core dimensions of the job characteristics model (JCM) among extension agents in Egyptian agricultural extension system. Agricultural extension system was chosen due to its importance in achieving sustainable agricultural strategy 2030. The study examined the effect of core job dimensions on both affective responses represented by satisfaction, and behavioural responses represented by performance. Core

job dimensions are skill variety, task identity, task significance, autonomy, and feedback. 230 extension agents were selected by formula. Data was collected from extension agents who attended the weekly meeting, which had been held in the sub-directorates in administrative districts. Regression analysis revealed that performance was not related to the core job dimensions while satisfaction was. The study posited that the managers of Egyptian agricultural extension system should put job characteristics into consideration for job redesign to enhance satisfaction and performance of extension agents.

Senen, Masharyono and Edisa (2020) examined the effect of job characteristics to employee's productivity. The study used descriptive analysis technique and a cross-sectional design. The study used 75 respondents who have been selected by using non-probability sampling. A questionnaire was used as a research instrument to collect the data from respondents. The analytical technique used is a simple linear analysis technique. Based on the results of the study using a simple linear regression analysis, there was a positive influence between job characteristics on employee performance. The study provides a basis for understanding the issues of job characteristics on employee performance.

Bremner and Carrière (2017) studied the effects of workers characteristics; skill variety, autonomy, task significance and task identity on job-related work stress at the medical facility and the mediating effect of the importance of work. A survey was conducted on a sample of approximately 1,100 workers from a Canadian hospital and was administered in the French language. The study established that skill variety was the most significant of all other job characteristics. The direct relationship between skill variety and cynicism suggests that having the opportunity to conduct complex and challenging work is engaging for those that work in the healthcare field. The four job characteristics examined in the study only helped to explain about twenty-four percent of the variance in meaningful work.

Wangechi (2014) studied the effect of multi-generational workforce on employee productivity. The study used case study research design. The study found that the differences between the mean scores of the perceptions of Millennials (18-33 years),

Generation Xers (34-48 years) and Baby Boomers (49-60 years) was not statistically significant at ($p < .05$) level in all the dimensions of reward management practices at Kengen. The findings regarding the effect that multi-generational perceptual differences with employee relations practices have on employee productivity showed that 56.8% of the respondents agreed that they were always informed before decisions that affect me at the company are made. Similarly, 59.5% of the respondents agreed that their boss always made them feel appreciated and valued and that they were allowed space and autonomy to do their work without being micromanaged. In addition, 67.6% of the respondents were satisfied with the rules and procedures they were expected to follow. However, the differences between the mean scores of the perceptions of Millennials (18-33 years), Generation Xers (34-48 years) and Baby Boomers (49-60 years) was not statistically significant at ($p < .05$) level in all the dimensions of employee relations practices. The study concluded that employee productivity did not vary with multi-generational perceptual differences with regards to the various dimensions of human resource development practices at the company.

According to Rowe (2010), individual members of each generation grew up at about the same time and were influenced by the same important cultural influences and major historical events of the era. Rowe (2010) expounds that the generation's shared experiences and cultural norms had an impact on how they currently act, work and think. He argues that while not every member of a generation will behave the same way, a significant number of individuals in that generation share characteristics that have become hallmarks of the group. In keeping with this perspective, Cekada (2012) notes that each generation thus has unique characteristics, influences, work ethics, core values, and respect and tolerance for others that affect how its members interact, communicate and learn in the workplace.

Huggins (2010) summarized characteristics that define each generation. He argued that traditionalists: have respect for experience, appreciate clear roles and responsibilities, cherish reputable organization and structure. He characterized the baby boomers as espousing ethical practices, leadership opportunities, warmth and caring culture as well as quality and teams. He considered generation X as valuing flexibility, opportunity to

grow and develop, quality products or services, efficient processes and competent people. Generation Yers are characterized as loving fun and flexibility, opportunities to continue learning, corporate responsibility, up-to-date technology and collaboration

Holtsnider and Jaffe (2012) recommend that having multiple generations on your team should be considered an enormous asset because it gives you a greater diversity of thinking, views, styles operating and knowledge base. In a study cited by the author, 43 percent of workers surveyed say multigenerational teams bring together people of varying experience levels to provide knowledge in specific areas; 27 percent of those surveyed say working with multiple generations allows for greater diversity of project teams so all points of view are heard; and 35 percent say working on multigenerational teams has led to increased productivity.

Sheahan (2015) argues that being as lifestyle centred as they are, Generation Y will expect a degree of flexibility in their workplace. Whether that be flexibility in regards to dress, or scheduling or flexibility in a work program will depend on where and for whom they work. He reports a research, which established that 82% of Generation Y cited flexible working arrangements as a factor that influenced their motivation and commitment, compared to the average of other age groups (Generation X and Baby Boomers) where between 58% and 69% said it was a factor influencing their motivation and commitment.

Lien, Kumbhakar and Hardaker (2018) examined how farmers' characteristics influences productivity and technical efficiency at the farm level. An unbalanced panel data set from 1991 to 2015 from Norwegian grain farms is used for this purpose. The results showed that the likelihood of off-farm work and the share of time allocated to it increase with increasing age (up to 39 years), and with low relative yields (compared to others farms in the surrounding area/region). The level of support payments is not significantly associated with the extent of off-farm work. Large-scale farms and single farmers tend to have a lower likelihood of off-farm work. Average technical efficiency was found to be 79%. Farmers with low variability in farm revenue were found to be more technically efficient than farmers with high revenue variability. The study did not find any evidence

of off-farm work share affecting farm productivity – the predicted off-farm work share was not statistically significant. In other words, we did not find any systematic difference in farm productivity and technical efficiency between part-time and full-time farmers.

Hansen and Jervell (2015) sought to establish how dairy farmers manage change as a result of the changes in policy and the introduction of automated milking systems (AMSs) in the dairy industry of Norway. The study used interviews to collect data from four dairy farmers who had invested in new loose housing and automated milking systems (AMSs). Three of the four farmers interviewed had also started joint farming. The study also used interviews to collect data from four dairy consultants. The study explored change through a change framework and used the data from the four farms to present and analyze the case in depth so as to present a conceptual framework for change management in dairy farms. The results showed that new farming systems and technology can be adopted on farms and yield varying results. Continuous and gradual change, intentional use of consultants and the careful planning of joint farming positively impact the performance of farming during and after the effecting of the change. The study also found that change should be seen as a managerial challenge and not just as the implementation of new technology.

Wachira (2012) conducted a study to examine how Kenya Tea Development Agency (KTDA) practiced change management and the effects and impact on the performance of the company as a whole. The study was based on the fact that a lot of organizations have benefited from innovation and have become more competitive. However, the success of such operations may not always be successful. Many organizations often have disappointing results as a result of missed targets, high costs and issues caused by the changes. KTDA has a mission to offer effective management to those in the tea industry. These management services involve efficient production, processing and marketing of quality tea products. They also include investments in related ventures for the benefit of investors, shareholders and other stakeholders. The study collected data from employees at KTDA. Interviews were the main instrument used to collect this data. The data was analyzed using content analysis and the findings of the study were presented in prose form. The study established that KTDA had gone through a process of restructuring

where a number of changes had occurred in staff positions, management, changes in staff remuneration, decentralization, products and services, change in the attitudes of the employees, advancement of technology and evolution of business units into subsidiaries of the KTDA. The changes in the organization were effective and resulted in an improvement of the performance and profitability of KTDA. The research study recommended that proper communication to the employees in the organization reduced the chances of resistance and improves chances of acceptance. The policies of the organization are readjusted to reflect the legal requirement that subsidiary units should be recognized as independent bodies.

Muchangi (2016) conducted a study to assess the effect of farmers' social economic characteristics, the agricultural extension and technology on enhancing the adoption of organic farming among trained farmers in Embu County in Kenya. The study was based on the fact that training of farmers is intended on promoting their knowledge and skills, changing their attitudes and enabling them to achieve their goals. The study used a descriptive sectional survey design and data was collected from three hundred (300) trained farmers. Descriptive analysis showed that among the farmers who took part in the study, there was high awareness of the organic farming technologies. Some of the socio-economic factors that were found to be influencing the adoption decisions of the farmers include their level of education, gender and income from non-farm related activities. The age of the farmer, the size of their farm and their contact with the promoters of the technology did not affect their choice on whether or not to adopt the organic farming technologies. The attributes linked to technology that negatively affected the adoption decision of the package included high costs involved, the perceived risk involved and the complexity of the technology. Those who adopted the package as a whole were encouraged to do so by the promise of high yields realized by adopting the package and the perceived low costs especially for farmers who already had organic waste as well as sufficient labour. Among those who adopted the technology, 60% of them reported an increase in their harvest per acre when compared to previous seasons prior to their adoption of entire organic farming. Many of those who did not adopt cited technology related costs, complexity as well as the perceived risks as the main reasons hindering their efforts to adopt the entire package. Generally, the factors influencing the adoption of

Organic Farming technologies in Embu County were technology related and economic constraints as opposed to the social attributes of the farmers.

Martínez-García, Ugoretz, Arriaga-Jordán and Wattiaux (2015) sought to explore whether the adoption of technology and the changes in management practices were associated with households, the structure of the farm and farmer characteristics. The study also sought to identify processes that may boost productivity and sustainability of dairy farming in Mexico. The study used factor analysis of data from 44 small-scale dairy farmers established that 3 variables, farm-size, farmer's engagement and household structure was cumulatively responsible for 70% of the variance. The analysis developed 3 clusters of farmers. The first contained farmers who had the least educational level but the greatest years of experience. The second cluster contained farmers who had access to extension, cooperative services as well as other changes in management. The third cluster contained the youngest farmers who had the highest education levels and had the greatest access to family labor. The availability of networks and membership in a community of peers were seen as important factors that contributed to the success of farmers. Smallholders were more attracted to technologies that are easy to implement and give immediate benefits. The farmers who did not use high investment technologies found them unaffordable due to the cost, insufficient farm sizes, a lack of know-how and unreliable electricity. The study recommended a multivariate analysis be conducted to help in planning extension activities and creating necessary channels of communication to effectively reach farmers with different needs, constraints and reasons for change. In identifying farmers who exemplify positive models of change, it becomes easier for those who may have structurally similar farms that are not performing at similar levels to increase their productivity.

Wilson (2014) sought to establish the farmers' characteristic that result in improved and high farm business performance in the UK. The common Agricultural Policy reform together with an increase in the unpredictability of the markets and of climate will require the agricultural industry to be competitive, resilient and to be sustainable with the existing environmental changes. The study used semi-structured interviews on 24 English farmers considered to be undertaking 'improved' farming. The study results indicated

that such farmers typically have agricultural qualifications, have a variety of information sources and can easily identify and capitalize on advantages specific to their farms. The study also established that such farmers tend to have low business related debt, use different methods of marketing and are informed on the latest developments and trends in the industry. In addition, the study found that these farmers look to maximize their profits by focusing on cost control, quality of products, paying attention to details and achieving high returns while mainly looking at the margins of the enterprise. Succession planning was important in the decision making process of some farms and that the decision making of the farmers is as a result of complex inter-connected issues. The study recommended that policy makers should try to fully understand the complexity of these issues and create policies that will achieve the set objectives.

Kinyangi (2014) sought to establish the factors that impact the adoption of agricultural technology among the small scale farmers of Kakamega North Sub-County. The objectives of the study were; to establish how capital and credit facilities affect the adoption of technology among the small holder farmers; to examine how training affects the adoption of agricultural technology among small holder farmers; to determine how the availability of extension services regarding agriculture affect the adoption of agricultural technology among small scale farmers; to determine the availability of markets impacts the adoption of agricultural related technology among small scale farmers of Kakamega North Sub County and to determine how the demographic makeup of the farmers affects their adoption of agricultural technology among small scale farmers in Kakamega North. The target population also included 5 key producer group leaders from each of the groups (125 in total), 15 respondents from the Kenya Agricultural Research Institute (KARI), 10 respondents from Bukura Agricultural Training College and one respondent from the Ministry of Agriculture. Data was collected through the use of questionnaires and interview schedules. The study revealed that capital and credit facilities had a positive and significant relationship with the adoption of agricultural technology, the results also indicated that training has a marginally positive and significant effect on the adoption of technologies among small scale farmers. The study also found that there was a marginally positive association between the availability of agricultural extension services and the adoption of agricultural technology. The results

further revealed that the availability of markets had a positive and significant effect on the adoption of agricultural technology. The study results also revealed that the demographics of the farmers i.e. the gender, age, educational levels have a significant effect on the adoption of technology. The variable on gender had a positive effect on the adoption of technology but it was insignificant. Based on the findings, the study recommended that the farmer's capital and credit facilities should be improved so that such services are readily accessible to the farmers. The farmers and extension officers should also be trained on how to use such technologies to raise farming yields. Conservation technologies and other technologies that can lead to an increase in the productivity of the farmers.

Nkari (2015) undertook a study to examine the effect of farmer characteristics on performance of commercial farmers from Kiambu County in Kenya. A semi-structured questionnaire was used to collect data and the data was analyzed through the use of both descriptive and inferential statistics. Most of the respondents were male and were above the age of 40. The respondents had at least a secondary level qualification and more than 5 years of experience in the farming of fruits and vegetables. Most of the farms in the study were smaller than 2 acres and were either owned by individuals or families. The study established that the main source of funding used by farmers were income from sales of farm produce and table banking. The study found that the relationship between the characteristics of farmers and the productivity of commercial farmers was significant statistically. The study was hampered by the limited scope that focused on a few aspects and mostly used self-reported data with no way of corroborating the facts. The study recommended that farmers should improve their abilities by joining group associations, improving their skills and education, conducting agricultural training and increasing their funding in order to enhance their performances. The government should install the required infrastructure and provide the necessary facilities and resources needed to enlighten and support farmers in their initiatives.

Reidsma, Ewert, Lansink and Leemans (2010) studied the adaptation of farmers in the European Union to the prevailing changes in climatic condition with regard to farm management and the socio-economic conditions. The study compared responses in crop

yields with those of farmers' income. The study also compared responses to variability of climate to temporal climate variability, responses at farm level to responses at regional level and final the study compared potential or prospective climate impacts to the actual climate impact. The study results indicated that the impact on the crop yields cannot be linked directly to the impact on farmers' income since farmers adapt by changing their crop rotations and inputs. Secondly, the impact of climate on spatial variability in crop yields and farmers' income levels i.e. lower yields in relatively warmer climates. This differs from the effects of temporal variance in climate, with more diverse patterns emerging across Europe. The study also revealed that the actual effect of climate change is dependent on the characteristics of the farm in question. These include the farm size, farming intensity and land use all of which affects the management and adaptation. The study concluded that to effectively understand the impact and adaptation of change to these farms, studies should consider responses at different organizational levels. Since different farms adapt and respond differently to change, diversifying the types of farms in a region reduces the impact of climatic change at the regional scale. The study found that management and adaptation systems could largely reduce or mitigate the effects of climate change and its effects on crop yields and the incomes of farmers. The study concluded that if climate projections are done accurately, then adaptation should not be viewed as an isolated process but as part of the models used to increase crop yields and boost farmers' incomes.

Peltonen-Sainio, Sorvali and Kaseva (2020) conducted a survey to examine the decision making of farmers and to identify potential hotspot that need sharing of knowledge, encouragement and subsidies. The study was based on the fact that farmers face multiple challenges in agriculture and they need to adapt in order to survive the changes they face and this is dependent on their knowledge, experience, their points of view as well as other motives they might have. The researcher issued 38,091 invitations to cover 80% of the farmers in Finland and 4401 were dully filled and return. The survey questions were grouped into 4 sections with structured statements regarding thee awareness of future changes, personal experience of said changes, views towards a variety of measures and the intentions to act. The study observed that farmers had experienced many changes related to weather. Farmers often find the need to make strides to manage crops,

condition of the soil and farming system in use. The study also established that the important measures had already been taken or were due to be taken by the farmers in the near future. However, the study observed that in some cases, there was a mismatch of information between scientific evidence/facts and what the farmers' understood to constitute change. This mismatch was also seen in the measures that needed to be taken in the future and what some farmers wanted to do. The study concluded that more efficient methods are required to share knowledge and information concerning future changes and the coping measures to be taken. The study posited that the use of policy incentives since the existing economic conditions were difficult for farmers and the measures in place mainly aimed to reduce the environmental footprint of farming and agriculture.

Oremo (2013) conducted a study to assess the perceptions of farmers and establishing coping mechanisms and examine the factors that affected the uptake of adaptation. The backdrop of the study was the variability of climate and the effect that the shift in the seasonal and weather patterns were having on rural households. For semi-arid regions such as Kitui County, which was the focus of the study, climate change makes residents very vulnerable since most of their production systems are reliant on climate. A large percentage of the population is unable to withstand climate change. The study sought to fill the gap concerning weather farmers in Kitui County were aware of climate change and its effects especially on their agricultural activities. The findings of the study will be important in developing measures of intervention to build resilience and reduce the vulnerability of said farmers. The study employed the use of both primary and secondary data. Primary data was collected from interviewing key informants, holding focus group discussions with the farmers and administering questionnaires to households. Through the use of semi-structured questionnaires, 332 farmers were assessed on their understanding of climate change and their adaptations to its effects. The study also analyzed the yields of maize crops relative to the amount of rainfall over a period of 17 years. The perceptions of farmers were analysed relative to meteorological data. The determinants of farmer perceptions and adaptations were examined using the Heckman probit model and the multivariate bivariate probit model (MVBPP).

The results from the regression analysis indicate that the mean annual rainfall experienced in the area decreased at a rate of 34mm every year. The results also showed that there was a high positive correlation between the amount of rainfall experienced and maize yields. The perceptions of farmers that the area was getting drier with time was consistent with the data on rainfall. The MBVP and the Heckman probit models revealed that educational attainment, extension service, access to water as well as social and economic group membership were main factors that affected adaptation uptake. As a result, improving these factors will be crucial in enhancing the adaptive capacity of farmers at household level. Based on these findings, national governments as well as county governments should create and enforce integrated policies that improve the awareness of farmers regarding climate change and build the resilience of local farmers by promoting the adaptation of climate-smart agriculture.

Lovely, Onyiyechukwu and Joseph (2020) sought to establish the impact of change management on the performance of Nigerian organizations. Change management refers to different interventions in organizations that when properly executed and in line with the events of the organization both internally and externally result in the organizational change. One change in an organization instantly leads to another. A key element of change is the application of organizational policies. As a result, implementation is an important factor when it comes to change management. Many organizations today suffer from the inability to get things done and the failure to implement crucial ideas and decisions. To achieve these objectives, managers need to move away from disjointed change programmes that only focus on present challenges and focus on methods that look ahead to future possible difficulties in the organization. Managers overseeing change must learn how to create and maintain teams that are capable of changing their vision and channel it into their technology, the products, processes and services. There have been many efforts made to execute change management but they have fallen short of the desired outcomes. This was seen from secondary data sources that included textbooks from different authors, publications, journals, magazines among others. The study concluded that it is important for managers to arm themselves with the knowledge of building and managing a group that can foresee new development and adapt its vision.

Since all organizations must go through change, managers and their groups must be open to change and be willing to make adaptations for the benefit of the organization.

Nwinyokpugi (2018) conducted a study to investigate the impact of change on organizations and how best to address such effects to ensure that the productivity levels of employees are enhanced. The target of the study was major banks and their branches in Nigeria's Rivers State. The study randomly sampled 152 respondents that included the bank employees as well as the management staff. The samples were obtained using Taro Yamen sampling formula. The findings of the study indicated that change management in all its dimensions including change identification, change communication, engagement of employees, change implementation and incentives has a significant effect on the productivity of employees. The study recommended that the communication of change should be systematic and that the implementation of change should begin at the top management and trickle down to the employee through a clear and consistent process. The incentives offered to employees should be based on the policies discussed in the contracts. The study also recommended that the employees who will drive the process of change should be involved in the implementation process to achieve the required productivity levels.

Al-Ali, Singh, Al-Nahyan and Sohal (2017) conducted a study to examine the effect of change leadership on organizational culture and the effect of change management practices in firms in the United Arab Emirates (UAE) public sector. The study also examined the mediating role of organizational culture on the relationship between leadership and change management in the organization. The study conducted an empirical test of the hypotheses through a confirmatory factor analysis and structural equation modelling. Data was collected from 210 mid-level management respondents in the UAE public sector. The findings of the study indicate that change-oriented leadership had a significant and positive impact on planned change. Similarly, hierarchical culture was established to have a positive and significant direct effect on both planned and unplanned (emergent) change management in UAE public sector organizations. Based on the findings, the study concluded that the role played by hierarchical culture in bringing change to the public-sector service organizations of the UAE gives important insight into

the empirical literature regarding change management and the issues facing such organizations.

2.2.4 Change Management, Situational Leadership, Farmer Characteristics and Sugarcane productivity

The sub-chapter examines if all predictor variables; Change Management, Situational Leadership and Farmer Characteristics can deliver well on Sugarcane Productivity as a response. Dindi (2013) has indicate a decline of productivity from 137 to 58 TCH between 1973 to 2010. International sugar sub-sector sugarcane yield is 63 TCH however, countries like Columbia in South America can attain 115TCH (Kenya National Assembly Report, 2015). The higher South America country index may depict better efficiency in the cane development resource deployment and GMP tool use on their cane yield predictor variable focus. The yield raise in Kenya may be a gradual process with several mitigations to regain desired yield responses.

Ndahiro, Shukla and Oduor (2015) study established a statistically significant relationship between change management and performance. The study examined effect of change management on the performance of government institutions in Rwanda. Survey research design was adopted. Quantitative and qualitative approaches were used. Primary and secondary data were used. Questionnaires were used to collect data. Data was analysed through SPSS and Microsoft excel. This study used purely primary data.

Irungu (2017) conducted a study to examine the change management practices adopted by Equity Bank. Change is difficult and inevitable due to the unpredictable nature of the current business environment. The need for change management has increased significantly among organizations in the last half century. Firms that want to stay competitive and survive change must adopt the right change management processes. Change is constant in organizational life and the ability to smoothly manage change is a key feature of successful organizations. Change management is the right application of knowledge, tools and the resources available at one's disposal to harness the benefits of change. The study was informed by the Resource Based View Theory and Kurt Lewin's change model. The study adopted a case study as well as an interview guide to collect

data. The collected data was organized and further analyzed using content analysis. The study found that Equity Bank institutes and uses multiple change management practices. The study recommends that Equity Bank should set up a strategy of flexible organizational structure so that all departments are linked and can enhance rapid decision making and promotes delegation within the organization. The study also recommended that the bank pay attention to the activities and the aspects of the employees that can promote their appreciation or motivation to embrace change.

Okoji (2014) studied the influence of leadership styles on community development program implementation in rural communities. The study adopted descriptive survey research of the ex post facto type. Purposive random sampling technique was used to select the state while stratified random sampling technique was used to select the local governments used for the study. Stratified random sampling technique was used to stratify the local government selected into stratum, simple random sampling technique was used to select the 179 respondents. The (CLPS) inventory and Community Members Assessment of Leaders Scale were used. Two hypotheses were answered and tested at 0.05 level of significance. Data were analysed using descriptive and Pearson's product moment correlation. The result of the influence of leadership styles on community development programmes implementation in rural communities was mostly influenced by Situational leadership style. The study emphasized that there is the need for proper dissemination of information from the rulers to the followers, through documentation and dissemination of information, the followers can share the best practices and learn from each other.

Alsaqqa (2020) sought to address the benefit of situational leadership in dealing with the context of healthcare organizations. This is because the healthcare industry over the past two decades has been unpredictable. This state of uncertainty was as a result of change in managed care, increased demand for quality care by clients and the expensive costs of new medical technology. These changes in the environmental factors have led to the development of new strategies by healthcare organizations and healthcare managers. Leaders in health organizations face a variety of challengers and responsibilities in their daily operations most commonly staff relations, continuous change and their ability to

meet the targets of the organization. As such, situational leadership needs one to create collaboration within the organization by pooling the knowledge of all staff together, defining the discussions to be held and to ask critical questions. The study concluded that leaders should be equipped with situational leadership skills for the enhancement of healthcare in health organizations

Akinbode and Al Shuhumi (2018) discussed change management and different styles of leadership. Given how volatile uncertain and ambiguous today's world is, organizations could be exposed by the constant change. In order to survive, organizations or institutions must be able to adapt positively to such changes. To successfully initiate and implement change initiatives, organizational leaders especially those in institutions of higher learning are required to be diligent and skilful in their activities. Data from previous studies indicated that seventy percent of all initiatives regarding change fail and this has mainly been as a result of the leaders' inability to anchor such programs effectively. Results from previous cases studies reveal that a failure to institutionalize change initiatives in a gradual manner as well as inappropriate styles of leadership were partly responsible for the failure of change initiatives especially in Higher Education Institutions (HEIs). The paper recommended that institutions of higher learning turn to learning organizations and adopt the transformational style of leadership if the change management process is to be effective. The leaders of these institutions need to begin a series of change programmes so as to be in touch with the developments of the modern world. The adoption of these change initiatives will enable them to meet the needs of society and stay relevant in the industry. The study recommends that the change process should be carried out diligently and follow the necessary preliminary tasks to increase the chances of success. The study concluded that whether change initiatives succeed or fail is dependent on how well the leaders made preparations for themselves and the institutions as a whole in readiness for change.

Wuryani, Rodlib, Sutarsib, Dewib and Arifb (2021) sought to investigate the effect of situational leadership on the work motivation of employees and consequently of employee performance through a decision support system. The study employed the use of quantitative research to obtain the relevant data. Data analysis was carried out using

smart PLS. The results of the study established that the decision support system (DSS) in situational leadership did not contribute to the improvement of employee performance. The study concluded that the role played by technology in a semi-structured decision making process must be guided by sufficient data so as to improve the levels of motivation and performance of the employees in the organization. Leaders often make unstructured decisions without consulting the data stored in such systems. As a result, the study was not as accurate as expected since the performance indicators were not adhered to in the decision making process.

Belias and Koustelios (2014) presented the effect of leadership and change management strategy on organizational culture. The study presented the notion of culture and defined organizational culture. The study examined organizational culture and defined the role of a leader. The paper agreed with the notion that strategic leadership should be transformational in order to make a difference in the organization. The study also assessed the notion of change and established that changing the culture of an organization is a large operation and all the organizational tools need to be put in place if it is to be get the desired results. To be able to effect positive change, one must be very concise and clear about what exactly they need to change and to what effect they're making the said changes. The findings of the study imply that leadership is closely linked to organizational culture mainly through the processes of outlining a certain vision and setting out the expectations. This paper provided an explorative and theoretical reference through a bibliography that can be used to guide further research.

Okiiya (2013) examined the relationship between change management and performance of public secondary schools in Siaya Sub-county. Cross-sectional survey design was adopted. Data was analyzed using the multiple regressions. Primary and secondary data were used. The study findings established that there was a statically significant relationship between change management and performance of schools. The study did not consider the mediating and moderating variables. The current study used purely primary data.

2.3 Summary and Research Gaps

The study reviewed extant literatures on change management, situation leadership, farmer characteristics and sugarcane productivity. It is established that little focus has been made on the interactions between change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. Most of the researched studies on change management have been done on manufacturing companies, learning and financial institutions. There is lack of evidence of studies on the change management and Sugarcane Productivity hence the study. The contextual gaps relate to the sugar factory cane catchments areas in Kenya. The conceptual gaps include those identified in the literature regarding the relationship between the concepts under study while the methodological include gaps in population and research design as well as in data analysis. The gaps identified during literature review are as summarized in Table 1.

Table 1: Summary of Literature and Knowledge Gaps

Researcher	Area of study	Methodology	Findings	Knowledge Gap(s)	Focus of current study
Al-Jaradat, Nagresh, Al-Shegran and Jadellah (2013)	Impact of change management on the performance of employees in university libraries in Jordan	Case study research design	The study findings revealed a statistically significant relationship between change management and performance.	Conceptual gap- The study was limited to university libraries in Jordan The study did not consider the mediating and moderating variables	This study was done in sugar factory cane catchment areas in Kenya. This study introduced farmer characteristics and situational leadership to examine the relationship between change management and productivity.
Okiiya (2013)	Change management and performance of public secondary schools in Siaya Sub-county, Kenya	Cross-sectional survey design	The study findings established that there was a statically significant relationship between change management and performance of schools	Used both Primary and secondary data.	The current study used purely primary data This study introduced the mediating and moderating variables
Ndahiro, Shukla and Oduor (2015)	Effect of change management on the performance of government institutions in Rwanda: A case of Rwanda revenue authority.	Survey design	The study results established a statistically significant relationship between change management and performance.	The study was limited to government institutions in Rwanda and used. Primary and secondary data	This study was conducted in sugar factory cane catchment areas in Kenya and used primary data
Ghazzawi, Shoughari and Osta (2017)	Situational leadership and its effectiveness in rising employee productivity: A study on North Lebanon organization	Descriptive research design	The study results revealed a positive relationship between situational leadership and employee productivity	The study considered the situational leadership as an independent variable.	This study assessed the moderating effect of situational leadership on the relationship between change management and productivity.

Researcher	Area of study	Methodology	Findings	Knowledge Gap(s)	Focus of current study
Raza and Sikandar (2018)	Impact of Leadership Style of Teacher on the Performance of Students: An Application of Hersey and Blanchard Situational Model.	Experimental research design	The study established that the situational approach had a strong positive a statistically significant impact on the performance of students particularly having low readiness level	The study however used experimental research design to assess the relationship between the study variables.	This study used cross sectional research design. This study introduced the moderating and mediating variables.
Nkari and Kibera (2016)	The influence of farmer characteristics on performance of commercial farmers in Kiambu County, Kenya.	Descriptive research design	The study findings showed that there was a statistically significant relationship between farmer characteristics and performance of commercial farmers.	The study used farmer characteristics as an independent variable rather than a mediating variable.	This study assessed the mediating effect of farmer characteristics on the relationship between change management and productivity.
Kurgat (2019)	Effect of Change Management on Organizational Performance of Media Companies in Kenya	Descriptive research design	The study findings found that there was a statistically significant relationship between change management and performance of Kenyan media firms.	Did not consider the moderating and the mediating variables.	This research examined the effect of mediating role of farmer characteristics and moderating role of situational leadership on the relationship between change management and productivity.
Kimhi and Oliel (2019)	Change management and organizational performance in selected manufacturing companies in Nigeria.	Descriptive survey design	The study findings revealed that change management strategies had a positive and a statistically significant effect on organizational performance	Contextual gap- The study only focused on manufacturing companies in Nigeria.	This study covered the entire sugar factory cane catchment areas in Kenya.

2.4 Research Hypotheses

H₀₁: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya.

H₀₂: There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.

H₀₃: There is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

H₀₄: The moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

2.5 Conceptual Framework

A conceptual framework or model offers a logical visual display structure of how ideas in a study relate to one another (Grant & Osanloo, 2014). Change Management is a predictor and sugarcane productivity is its response, while Situational Leadership is Moderator and Farmer Characteristics is a Mediator in the relationship. The unique variable relationships to sugarcane productivity are best depicted, for this study, in the conceptual framework or model presented in Figure 2.

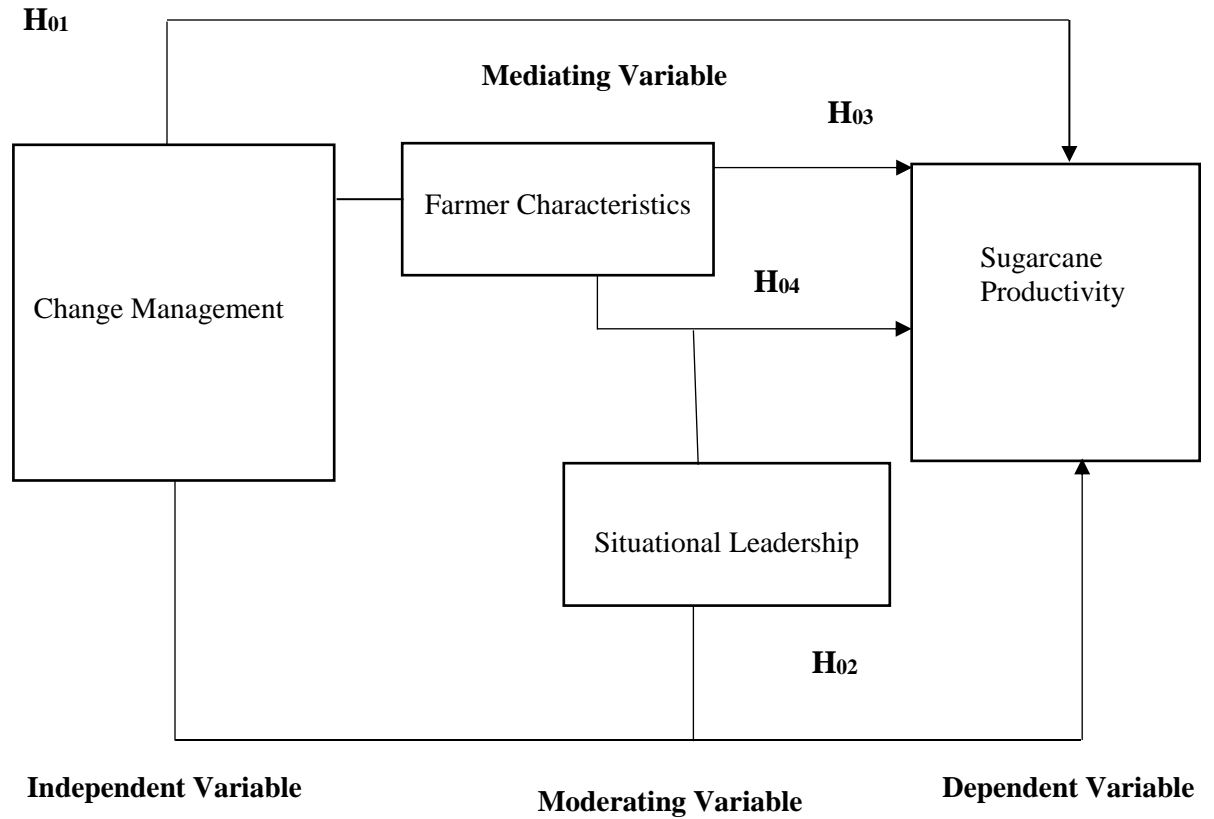


Figure 2: Conceptual Model

2.6 Operationalization of Study Variables

Table 2 ahead presents the operationalization of the study variables.

Table 2: Operationalization of the Study variables

Study Variables	Indicators	Measurement scale	Question	Supporting Literature
Independent Variable: Change Management	Innovation Training Access to land Access to funds Operational changes	Interval	Section B	Kimhi and Oliel (2019); Kurgat (2019); Ndahiro, Shukla and Oduor (2015); Wanza and Nkuraru (2016)
Moderating Variable: Situational Leadership	Club Type Moderate Type Task Type Teamwork Empowerment	Interval	Section D	Ghazzawi, Shoughari and Osta (2017); Tortorella and Fogliatto (2017); Raza and Sikandar (2018); Ruslan, Lian and Fitria (2020)
Mediating Variable: Farmer Characteristics	Veterans Character Baby Boomer character Xers character Nexters character Problem solving character	Interval	Section C	Nkari and Kibera (2016); Samarpitha, Vasudev and Suhasini (2016); Owino, Odondo and Obange (2018)
Dependent Variable: Sugarcane Productivity	Cane yield Extension service Cost of inputs Labour Quality	Interval	Section E	Tena, Mekbib, Shimelis and Mwadzingeni (2016); Pokharel, Uprety, Mehata, Shrestha and Panday (2019)

2.7 Chapter Summary

The chapter looked at the various theories underpinning this study. Conceptual and empirical literature has also been reviewed. The chapter discusses the conceptual and empirical reviews on change management, situational leadership, farmer characteristics and sugarcane productivity. The relationship between the study variables is also discussed in detail. A summary of research gaps is presented outlining the focus of study, findings and conclusions, the knowledge gaps and how the current study addresses them. The study conceptual model has been highlighted in Figure 2 and the next chapter presents the research methodology that guided this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology which was presented in the following order; research philosophy, research design, population of the study, sample and sampling techniques, data collection and instruments, pilot study, reliability and validity, data processing and analysis and hypothesis testing. This chapter also includes the analytical models, ethical considerations and chapter summary. The focus of the study was to determine the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya.

3.2 Research Philosophy

Research philosophy refers to the development of knowledge and its nature with its choice being fueled by researchers' assumptions, personal beliefs, interests and purposes (Saunders, Lewis & Thornhill, 2012). There are four main research philosophies and these are: realism, interpretivism, positivism and pragmatism. Another school of thought says research philosophy scope can be positivist, constructivist or pragmatist depending on the approach to be used for the study (Coopers & Schindler, 2014).

Realism is based on the understanding that objects exist independently of our knowledge implying existence of a reality independent of the human mind (Saunders et al., 2012). As for interpretism the philosophy is grounded on the subjective interpretation and intervention in reality to fully understand it, acknowledging the researcher's ability to affect the phenomena under study. Differently, positivism is concerned with testing a theory in order to understand a phenomenon (Thorpe & Jackson, 2008). Positivism can be applied where a formal proposition is evident, where the variables are quantifiable, when testing the hypothesis and when drawing inferences on the phenomenon from a given sample of the population (Saunders, Lewis & Thornhil, 2012). Pragmatism argues that it is possible to work with both positivist and interpretivist philosophies with the

most important determinant of research philosophy being the research question due to its practical usefulness and its ability to bring about informed change (Agerfalk, 2010). This study adopted a positivist philosophy, which involves collection of empirical data, use of scientific methods and a statistical analysis approach to infer knowledge about the real world.

3.3 Research Design

This study employed a cross-sectional research design. A cross-sectional survey tool was chosen to handle data from 13 mill cane catchment areas. According Kesmodel (2018) the survey method is low cost and gives high reliability and validity. This study used a cross-sectional design to determine the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya at a particular point in time.

3.4 Population of the Study

A population is a group of individuals or objects with common characteristics that are included or excluded in a study target group (Mugenda & Mugenda, 2003). The sugar sub-sector sugarcane production population of 394,321 individuals make a target population of: 392,282 farmers and 2,039 extension service staff or situational leaders. This population works on a farm area of 188,449 hectares as cane catchments at 13 sugar factories which are units of analysis as listed in Appendix VII.

3.5 Sample and Sampling Techniques

Sampling techniques allow random isolation of a representative sample from a target population for study or investigation. Simple random sampling, Systematic sampling, stratified sampling, purposive sampling and convenience sampling are among several methods available for sample establishment. Stratified sampling and purposive sampling was used in this study as described by Slovin (1960) and Tongco (2007) respectively. Slovin (1960) formula may be used in deriving a sample size, n , from a target population (Wachiuru, 2015):
$$\text{Sample size } n = \frac{N}{1+N(e)^2}$$
 Where: n = unknown sample size; N =

Target population size; e: significance level at 0.05 confidence level for this model. Therefore, for this study a farmer/follower target population of 394321 a respondent sample size is 400: $n = 394321 / 1 + 394321(0.05)^2 = 400$. The sample should generate a normal distribution of observations. The sample is distributed against mills by proportionate stratification of the target population of special cane farmer characteristics of: Veterans, Baby Boomers, Xers and Nexters against each mill (Appendix D and Table 3).

Cane catchment sugarcane farming 78 situational Leaders or extension staff pre -qualify for a domain of special skills (they each independently possess ,by their job description at each of the 13 factories).The study leader cadres are; Managing Director, Head of Agriculture Operations, Cane Development Manager, Extension Services Manager, and Agronomist. In total, therefore 478 respondents participated in the study using the questionnaires or instruments (Table 3 and 4). Change Management, Situational leadership, and Farmer Characteristics variable data for analysis and hypotheses testing for the study was generated.

Table 3: Proportionate, Stratified and Purposive Farmer Sample Size

Factory	Total Farmer population	Total proportionate Farmer sample	Veterans	Baby boomers	Nexters	Exters	
KISCOL	500.	1	3	3	3	3	12
Sony	21,585	22	6	6	6	6	24
Sukari	14,228	15	4	4	4	4	16
Transmara	25,000.	26	6	6	6	6	24
Chemilil	11,300	12	3	3	3	3	12
Kibos	25,000.	26	6	6	6	6	24
Miwani	1	0	3	3	3	3	12
Muhoroni	15,000.	15	3	3	3	3	12
Soin	2680.	3	3	3	3	3	12
Butali	60,000	61	14	14	14	14	56
Kabras	86,000	88	19	19	19	19	76
Mumias	62,356	64	15	15	15	15	60
Nzoia	68,632	70	15	15	15	15	60
Total	392,282	400	100	100	100	100	400

Table 4: Purposive Agriculture Employees (Situational Leaders) Sample Size

Factory	Managing Director	Head of Agriculture Operations.	Cane development Manager	Extension Services	Agronomist	Total
KISCOL	1	1	1	2	1	6
Sony	1	1	1	2	1	6
Sukari	1	1	1	2	1	6
Transmara	1	1	1	2	1	6
Chemelil	1	1	1	2	1	6
Kibos	1	1	1	2	1	6
Miwani	1	1	1	2	1	6
Muhoroni	1	1	1	2	1	6
Soin	1	1	1	2	1	6
Butali	1	1	1	2	1	6
Kabras	1	1	1	2	1	6
Nzoia	1	1	1	2	1	6
Mumias	1	1	1	2	1	6
TOTAL	13	13	13	26	13	78

3.6 Data Collection and Instruments

The study employed quantitative data collection methods. The researcher used structured questionnaires. The quantitative method is appropriate in examining the relationship between variables in the study. Allwood (2012) indicate that the quantitative method is appropriate in analyzing quantifiable and numerical data in research. This study was quantitative in nature with data obtained through close-ended questions (Cooper & Schindler, 2014). A questionnaire with a 5-point Likert rating scale was used to collect data. The questionnaire was divided into five sections. The first section capturing the demographics on the gender, age and education of the respondents. The questionnaire remaining sections focused on the research questions with: Section two focused on identifying the change management in place in the sugar factory cane catchments areas

and its effect on sugarcane productivity, section three focused on situational leadership and its effect on sugarcane productivity and section four focused on farmer characteristics and its effect on sugarcane productivity and finally section five focused on sugarcane productivity. The study used purely primary data sources. The use of questionnaires was justified because they are an effective way of collecting information from a large sample in a short span of time and at a reduced cost than other methods (Orodho, 2012). Further, questionnaires facilitate easier coding and analysis of data collected. The researcher administered the questionnaires through drop and pick .for an increased response rate.

3.7 Pilot Study

A pilot study was carried out to ensure that the questionnaires meet the set study objectives. Pilot testing helps in determining whether the data collected gives expected answers to the research questions (Saunders et al., 2012). Pilot testing is also essential in determining the research instruments' reliability and validity. A sample equivalent to 10% of the study factory population of 13, as suggested by Koopman (2015), was used to obtain a pilot study cane areas. This realised Transmara and Nzoia factory cane catchment areas as two random choices of the 13 Sugar Factory cane catchments areas for the pilot study.

3.7.1 Validity

Validity refers to the performance of the instrument. Picco, Middleton, Bruno, Kowalski and Nielsen (2020) highlight that instrument validity is a product of construct validity, content validity, and face validity involving infusing predictor key questions in the instrument and ensuring content of such questions are all included with some level of polishing up for content and some subjective concerns for the built up. Validity is the extent to which evidence as well as expert's back-up the explanations of test scores involved by suggested uses of tests (Bell, Bryman, & Harley, 2011). Validity is established mainly by the presence or absence of systematic error in the data.

The questionnaire developed for this study was tested for internal consistency with the pilot study and a raise in the predictor observations. Criterion validity is a test on how well the internal consistent for a tested pair of data is from a Pearsons Product Moment correlation. In this study, an expert opinion from research assistants and supervisors was sought on the validity of the questions in the questionnaire. Unclear questions were reframed, some questions added, and others discarded. This study adopted content validity. Content validity was increased by studying questionnaires and questions used in similar studies.

3.7.2 Reliability

Reliability is the capability of the instrument to generate data on a relevant or actual area of investigation (Taherdoot, 2016). However, instrument reliability alone cannot be said to be fully working well unless there is validity confirmation. Reliability of the instruments was measured to determine internal consistency to yield the expected results. As observed by Eriksson and Kovalainen (2015), instruments with a reliability index of 0.5 and above can be used to collect data. According to Bryman and Bell (2011), a reliability index of 0.7 or 70% is satisfactory for any research instrument.

McNeish (2018) qualifies Cronbach's alpha as being the most common scale in measuring internal consistency of any data pair and therefore this study adopts this scale for measurement instrument performance. Taber (2018) quotes a consistent Cronbach of 0.6-0.7 level as being good enough for internal consistence from the work of van Griethuijsen et al; 2015). Cronbach's alpha was used on the standardized items. The closer Cronbach's alpha is to 1, the higher the internal consistency reliability (Sekaran & Bougie, 2016). If the Cronbach's alpha is above .70 the instrument is reliable

3.8 Data Processing and Analysis

The collected data was analyzed using quantitative data analysis methods. Quantitative method involved both descriptive and inferential analysis. Quantitative data was analysed using Statistical Package for Social Sciences (SPSS version 22). Descriptive statistics

including mean and standard deviation were presented using tables. To test the nature and strength of relationships between the study variables, inferential statistics using multiple and hierarchical regression was conducted and presented using tables. Multiple regression was used to test the relationship between two variables. Stepwise multiple regression analysis was examined the relationship between a set of independent variables and dependent variable. Path analysis was used to test for mediation of farmer characteristics on the relationship between change management and sugar productivity while the Baron and Kenny (1986) method was used to test for moderation of situational leadership. The researcher carried out diagnostic tests to confirm data normality, linearity, and multicollinearity before actual data analysis.

For normality, the researcher used frequency distribution tables, stem and leaf plots, and P-P (probability-probability) Plots and numerically using skewness, kurtosis and Shapiro-Wilk's W test. These are important because correlation, regression, t- tests, and analysis of variance all assume that data is normally distributed. Histograms, scatterplots, normal P-P plots were used to test for heteroscedasticity by splitting the data in high and low value to assess whether the samples are significantly different. In addition, the Levene's test was used to assess the assumption that variances of the populations from which different samples were drawn, are equal. Multicollinearity, was tested by examining tolerance and the variance inflation factor (VIF) and finally, linearity was tested using scatterplots and analysis of variance (ANOVA).

3.9 Hypotheses Testing

The hypotheses was tested using a multiple regression model, since the hypotheses are premised on a single response variable that depends linearly on a number of predictor variables. The assumptions associated with a linear regression model are Linearity: The relationship between X and the mean of Y is linear, and shows homoscedasticity: The variance of residual is the same for any value of X, Independence: Observations are independent of each other.

management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The model checks the prediction of the dependent variable, “SP”, differs across levels of a third variable, “SL”. Since the moderating variable affects the strength and direction between the independent and dependent variable, the test involves determination of the statistical significance of the interaction term (Whisman & McClelland, 2005).

$$SP = \alpha + (\beta_1 CM) + \varepsilon \dots \dots \dots (3)$$

$$SP = \alpha + (\beta_1 CM) + (\beta_2 SL) + \varepsilon \dots \dots \dots (4)$$

$$SP = \alpha + \beta_1 CM + \beta_2 SL + \beta_3 CM * SL + \varepsilon \dots \dots \dots (5)$$

Where:

SP= Sugarcane Productivity; CM= Change Management; SL= Situational Leadership; α = constant (intercept); β =Coefficient parameters to be determined, composite* =interaction term, ε = Error/disturbance)

ε = Constant error

3.9.3 Mediating Model

Four Step Mediation Methodology (Baron & Kenny, 1986) was used to establish the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

Step 1: a regression analysis of CM Predicting SP

$$SP = \alpha + \beta_1 CM + \varepsilon \dots \dots \dots (3)$$

Step 2: a regression analysis of CM Predicting FC

$$FC = \alpha + \beta_1 CM + \varepsilon \dots \dots \dots (6)$$

Step 3: a regression analysis of FC Predicting SP:

$$SP = \alpha + \beta_2 FC + \varepsilon \dots \dots \dots (7)$$

If the relationship is significant then proceed to:

Step 4: a regression analysis of CM and FC Predicting SP.

$$SP = \alpha + \beta_1 CM + \beta_3 FC + \epsilon \dots\dots\dots (8)$$

SP= Sugarcane Productivity;

CM = Change Management,

FC = Farmer Characteristics

β = Coefficient parameters to be determined

ϵ = Constant error

Steps 1-3 was used to establish that zero-order relationship exists among the variables. Situations where one or more of the relations is non-significant depicts no possibility of mediation (Baron & Kenny, 1986). If there are significant relationships from Step 1 to Step 3, then one proceeds to Step 4 where the mediation is supported if the effect of FC remains significant after controlling for CM. If CM is not significant when FC is controlled, then there is full mediation, and if both CM and FC significantly predict P, there is partial mediation.

3.9.4 Moderated Mediation

To establish if the mediating effect of farmer characteristics is different from the moderating effect of situational leadership in the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya, Hayes and Rockwood (2020) model for moderated mediation was adopted.

$$SL = i_M + aCM_i + \epsilon \dots\dots\dots (9)$$

$$SP = i_Y + c'CM + b_1SL + b_2 FC + b_3SL*FC + \epsilon \dots\dots\dots (10)$$

Where;

i_Y and i_M = Constants

SP= Sugarcane Productivity;

SL= Situational Leadership;

FC= Farmer Characteristics

SL*FC = Interaction

3.10 Analytical Models

Table 5: Objectives, Hypothesis Testing, Analysis and Model Estimation

Objectives	Hypotheses	Analytical Model	Analyses	Interpretation of Results
1. To determine the effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya	H₀₁ : There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya.	Univariate model $SP = \beta_0 + \beta_1 CM + \varepsilon$ Where: SP = Performance CM= Change Management	Simple linear regression	<ul style="list-style-type: none"> • R² for goodness-of fit • F-test for overall significance • t-test for individual significance • Marginal changes
2. To establish the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya.	H₀₂ : There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.	Multivariate model for moderation i. $SP = \alpha + \beta_1 CM + \varepsilon$ ii. $SP = \alpha + \beta_1 CM + \beta_2 SL + \varepsilon$ iii. $SP = \alpha + \beta_1 CM + \beta_2 SL + \beta_2 CM * SL + \varepsilon$ Where: $\beta =$ Intercepts, β_0, β_1 to $\beta_4 =$ Coefficients SP = Sugarcane Productivity SL = Situational Leadership CM = Change Management	Multiple linear regression	<ul style="list-style-type: none"> •R2 for goodness-of fit •F-test for overall significance •t-test for individual significance •Marginal changes •Check on R2 change if positive it means enhancing moderation
3. To determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya	H₀₃ : There is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya	Multivariate model for mediation i. $SP = \beta_0 + \beta_1 CM + \varepsilon$ ii. $FC = \beta_0 + \beta_1 CM + \varepsilon$ iii. $SP = \beta_0 + \beta_2 FC + \varepsilon$ iv. $SP = \beta_0 + \beta_1 CM + \beta_2 FC + \varepsilon$ Where: SP = Sugarcane Productivity CM = Change Management FC = Farmer Characteristics $\beta_0 =$ Intercept, $\beta_1, \beta_2 =$ Coefficient $\varepsilon =$ Error term	Multiple linear regression and Baron and Kenny's test	<ul style="list-style-type: none"> • R² for goodness-of fit • Test i, ii & iii, If significant, move to iv. Control CM in model iv, if M becomes insignificant then there is full mediation if both are significant then there is partial mediation

Objectives	Hypotheses	Analytical Model	Analyses	Interpretation of Results
4. To establish the moderating effect of situational leadership on the mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.	H ₀₄ : There is no significant moderating effect of situational leadership on the mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.	Stepwise regression analysis: $SL = \alpha + \beta_1 CM + \varepsilon$ $SP = \alpha + \beta_1 FC + \beta_2 SL + \beta_3 FC * SL + \varepsilon$ Where; SP = Sugarcane Productivity SL = Situational Leadership FC = Farmer Characteristics CM = Change Management ε = Error term	Multiple linear regression (Hayes & Rock wood Model, 2020)	<ul style="list-style-type: none"> • R² for goodness-of fit • F-test for overall significance • t-test for individual significance • Marginal changes

3.11 Ethical Considerations

The researcher ensured adherence to ethical standards thus providing assurance about the integrity of the study. Proper referencing was made where the researcher cited and used previous authors' ideas and concepts to safeguard the issue of plagiarism. In addition, the researcher followed ethical guidelines which involves adherence to informed consent, confidentiality, voluntary engagement of participants and anonymity factors among other ethical issues as explained in this section.

3.11.1. Informed consent of participants

A letter of authority for the researcher was obtained from the Management University of Africa stating the topic of research and purpose of the same. Secondly, the researcher obtained the requisite permission to conduct research in Kenya from the National Council for Science, Technology and Innovation (NACOSTI). All approvals for the study were availed to the participants. Participants were also made aware about the purpose of the study and their role in the research exercise. The foregoing information enabled

participants give consent while having all information necessary. The research team were taken through this procedure before the beginning of the exercise to enhance compliance.

3.11.2. Voluntary engagement of participants

The researcher ensured that participants were informed from the onset that their involvement in the research was voluntary and without any persuasion or coercion. The participants were free to withdraw from the exercise. Free participation generates goodwill from the participants and thus helps enhance level of participation and objectivity.

3.11.3. Confidentiality of participants

Another important issue that was observed during the study was the aspect of confidentiality. In the letter of introduction attached to the questionnaire, it was clearly stated that the information the participants were to provide will remain confidential and will only be used for purposes of research. They were also informed that as a matter of professional ethics, the researcher is personally responsible on the issue of confidentiality. This helped build trust and provide assurance to the participants on confidentiality.

3.11.4. Anonymity of participants

The study entailed administering of questionnaires and thus cannot be considered entirely anonymous. However, to mitigate on any potential risk related to anonymity, the research instruments were developed to ensure that the participants names, telephone numbers and email addresses were not documented. In addition, data collection instruments were coded and only accessible to the researcher. This made it difficult for anyone to identify participants involved in the study thus giving some level of assurance on anonymity to participants who were involved in the research activity.

3.12. Chapter Summary

This chapter discusses the general methodology that was used in this research to answer the research questions and to achieve the set study objectives. The research philosophy, research design, target population, respondents of the study, data collection and instruments, data collection procedure was discussed. The chapter also discusses piloting, hypotheses testing and ethical considerations.

CHAPTER FOUR

DATA ANALYSIS AND RESEARCH RESULTS

4.1 Introduction

This chapter presents the data analysis and research results. The study establishes the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. Section one presents the results of the demographic and the pilot survey. The pilot survey section entails validity, reliability, diagnostics tests and factor analysis. Section two presents the descriptive statistics for change management, situational leadership, farmer characteristics and sugarcane productivity. The last section contains correlation analysis and hypothesis testing. The testing was done for the four study lines by hypothesis to find out if: H₀₁: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya; H₀₂ There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. H₀₃: There no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya; and lastly but not least find out if by: H₀₄: There is no significant moderating effect of situational leadership on the mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

4.2 Response Rate

The response rate was analysed to show the representativeness of the sample size. A response rate is very important to the credibility of the research results. A low response rate may decrease the statistical power of the data collected and undermine the reliability of the results. It may also undermine the ability of the researcher to generalize the results to the population. This is further complicated by the fact that a low response rate can be indicative of a non -response bias within the sample. A low response rate can give rise to

sampling bias if the non -response is unequal among the participants regarding exposure and/or outcome. The study administered 478 questionnaires’ to the respondents and the results were favourable with a 96 % success rate (Table 6).

Table 6: Response Rate

Category	Administered Questionnaires	Returned	Unreturned	Response Rate
Managers	78	74	4	94%
Farmers	400	392	8	98%
Total	478	466	12	96%

Results in Table 6 show that 478 respondents comprising of 78 top managers and 400 farmers were administered with the questionnaire. A total of 74 top managers and 392 farmers successfully filled and returned their questionnaires translating to a 96% response rate. According to Mugenda and Mugenda (2003) and Kothari (2004), a response rate of above 50% is adequate for a descriptive study. Babbie (2004) also asserted that return rates of above 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Thus, 96% was considered very good for the study.

4.3 Demographic Characteristics of Respondents

Demographic are characteristics of a population. Demographic information provides data regarding research participants and is necessary for the determination of whether the individuals in a particular studies are representative sample of the target population for generalization purposes. Demographic analysis was done to study the nature in which the population changes over time, and this is important as it allows us to study how changes to the population. The demographic characteristics included gender, level of education, age bracket and duration of sugarcane farming. Each of the demographic characteristic is discussed on the subsequent sections.

4.3.1 Gender of Respondents

The study conducted demographic on gender for the respondents to establish the gender diversity. The respondents were asked to indicate their gender. The results are as shown in Table 7.

Table 7: Gender of Respondents

Gender	Frequency	Percentage (%)
Managers		
Male	41	55
Female	33	45
Total	74	100
Farmers		
Male	250	64
Female	142	36
Total	392	100

The results show that majority of members in the management were male represented by 55% and female at 45%. This indicates that the management of the sugarcane companies had more male representation. A study by McKinsey Global Institute (2017) found that lack of gender diversity is associated with a greater likelihood of below performance assessment review performance and when institutions commit themselves to diverse leadership, they are more successful. One the other hand, in organizations where gender diversity is lacking, employees gave lower marks to their institutions for such factors as motivation, capability, accountability, and innovation. The gender for the farmers was at 64% for male and 36% for female, which could imply that the male mostly did sugarcane farming.

4.3.2 Level of Education

Education level refers to the academic credentials or degrees an individual has obtained. The respondents were asked to indicate their level of education. The results as shown in Table 8.

Table 8: Level of Education

Level of Education	Frequency	Percent (%)
Managers		
Bachelor degree	21	28
Master's degree	39	53
PhD	14	19
Total	74	100
Farmers		
High school	27	7
Certificate	94	24
Diploma	137	35
Bachelor degree	78	20
Master's degree	43	11
PhD	12	3
Total	392	100

The results show that most of the respondents in management had a master's degree represented by 53% followed by a bachelor's degree at 28% and PhD had 19%. Further, the results show that most of the sugarcane farmers had a Diploma represented by 35% followed by Certificate at 24%. The farmers with a degree were at 20% while those with master's degree were at 11%. The least was high school and PhD at 7% and 3% consecutively. According to Mesároš, *et al* (2017), education process is a first step and presumption for better performance and results of every leader. The achievement of higher level of education increases the precondition for its successful results in the management and involvement of institutions. Knowledge and a high level of education is only one prerequisite for achieving successful results.

4.3.3 Age of Respondents

The managers and the farmers were asked to indicate their age brackets. The results are shown in Table 9.

Table 9: Age of Respondents

Age bracket (years)	Frequency	Percent (%)
Managers		
21-40	4	5
41-60	53	72
61-77	11	15
78-99	6	8
Total	74	100
Farmers		
21-40	24	6
41-60	216	55
61-77	110	28
78-99	42	11
Total	392	100

The results indicate that out of 392 cane farmers responding the majority at 55% composition were 41-60 years of age or in the Xers generation. 61-77 years old age type or Baby boomer farmer type claimed 28%.composition to be second. The Veterans with 78 years and above made 11% of the sample. The youngest farmers or nexters with age range of 21-40 years had 6% composition. Overall there was a relative proportionate actual farmer type in the sample of 392 starting with Xers, Baby boomers, Veterans and then lastly Nexters as explicitly classified by Arsenault (2004). This implied that the respondent characters were introduced and present in the study design for evaluation on sugarcane productivity. The age of the managers indicated that as respondents they were mature in general and like their followers this was an important characteristic in understanding their views about a particular test instrument issue. The 74 managers or situational leaders task capabilities were inherent in their job assignments for sugarcane productivity. The respondent mean age of 41-60 years and above or with 94% and above of the composition indicated good level of maturity of individuals for quality potential response to the test instrument.

4.3.4 Duration at Agency

The farmers were asked to indicate the duration they had done sugarcane farming. The results are shown in Table 10.

Table 10: Duration of Sugarcane Farming

Duration	Frequency	Percent (%)
Below 5 years	58	15
5 to 10 years	67	17
11 to 15 years	71	18
16 to 20 years	94	24
Over 20 years	102	26
Total	392	100

The results showed that majority of the farmers had done sugar cane farming for over 20 years at 26%. This was followed by 16-20 years' experience represented by 24% while 11-15 years with 18%. 5 to 10 years farming had a close 17% composition. Below 5 years farming stood at 15% composition to be last. Generally, the farmers had done sugarcane farming for a considerable period ranging from 5 years to over 20 years. These farmers were familiar with sugarcane farming.

4.4 Results of the Pilot Survey

Pilot testing is the initial evaluation of the interview guide to find out its feasibility before embarking on the research project. Pilot testing the research instrument helps provide feedback as to the clarity of the respondents' understanding of the interview questions, and indeed also aids in determining whether the instrument responds, as envisaged, to the research questions. The questionnaires for this study were subjected to a pilot test on a sample of 48 respondents that represent 10% of the study population. This was conducted in Transmara and Nzoia sugar factory cane catchment areas. The pilot tests included validity and reliability tests. The pilot study respondents were not included in the final data collection.

4.4.1 Validity

Validity is defined as the accuracy with which an instrument measures what it claims to measure. Validity test is conducted to ensure that the measurement scale indeed measures the unobservable construct that it intended to measure. It can be assessed using theoretical or empirical approaches as pointed out by Bhattacharjee (2012). Theoretical assessment of validity, which is also referred to as translational/content validity consisting of two sub-types: face and content validity, focuses on how well the idea of a theoretical construct is translated into or represented in an operational measure. For construct validity, the study used Keyser Meyer Olkin (KMO) and Sphericity methods.

4.4.1.1 Content Validity

To achieve content validity, procedures recommended by Cooper and Schindler (2013) were used. Precisely, identification of the existing scales from the literature, developing data collection instrument and administering it to conveniently selected two experts in each field of change management, situational leadership and farmer characteristics and sugarcane productivity were used. Modifications arising from these experts were incorporated in the survey tool for clarity, comprehensiveness, relevance, meaning and requisite depth. The instrument was further reviewed by peers who are PhD (in management and leadership) candidates at MUA University and their comments considered. A final review of the data collection tool was done by supervisors and their valuable recommendation used to finalize the instrument. This procedure was done to ensure that the measurement scales items had adequately translated from theory, therefore measuring the constructs of the study adequately. Since it appeared evident to the experts that the measure showed adequate coverage of the concept, the measure was considered to have achieved face validity as asserted by (Zikmund, 2003).

4.4.1.2 Construct Validity

Construct validity is the degree to which a test measures what it claims, or purports, to be measuring. Construct validity is the degree to which inferences can be made from operationalization's (connecting concepts to observations) in your study to the constructs on which that operationalization are based. This is considered a subjective form of measurement because it still relies on people's perception for measuring constructs that would otherwise be difficult to measure. For construct validity, the study used Keyser Meyer Olkin (KMO) method and test of Sphericity as engaged by (Dikko, 2016).

Kaiser-Meyer-Olkin (KMO) Test is a measure of how suited data is for Factor Analysis. The test measures sampling adequacy for each variable in the model and for the complete model. The statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion, the more suited your data is to factor analysis. The average response rate for each variable was used in the test. The rule of thumb is that if KMO value is more than 0.4 and the P-value of Sphericity is less than 0.05, then the statements are valid the variable measures what its purports to measure. Results are presented in Table 11.

Table 11: Construct Validity

Variable	KMO Value	Sphericity
Change management	0.6271	0.021
Situational leadership	0.526	0.004
Farmer characteristics	0.532	0.000
Sugarcane Productivity	0.663	0.003

Results in show that Change management had a KMO value of 0.627 and Barlette's test of sphericity of $0.021 < 0.05$ and thus the statements are valid: the variable measures what its purports to measure. Situational leadership had a KMO value of 0.526 and Barlette's test of sphericity of $0.004 < 0.05$ and thus the statements are also valid and it measures

what it purports to measure. Farmer characteristics had a KMO value of 0.532 and Barlette's test of sphericity of $0.000 < 0.05$ and thus the statements are valid and it is accepted that it measures what it purports to measure. Lastly, Productivity had a KMO value of 0.663 and Barlette's test of sphericity of $0.003 < 0.05$ and thus the statements are valid/it measures what it purports to measure. In conclusion, all the variables met the minimum KMO value of 0.4 and Barlette's test of sphericity of < 0.05 and thus they were valid.

4.4.2 Reliability Test

The reliability of an instrument refers to its ability to produce consistent and stable measurements. It estimates how accurately the data obtained in the study represents a given variable or construct in the study (Mugenda & Mugenda, 2003). The goal of reliability is to minimize the errors and biases in a study (Yin, 2013). To ensure the reliability of the study instrument, a pilot survey was carried out to test and improve the flow and clarity of the questionnaire before the actual data collection (Wisner, 2007).

In this study, Cronbach's Alpha (Cronbach, 1951) was used to test the reliability of the proposed constructs. Known for its stability and flexibility, Cronbach's alpha is a function of internal consistency or interrelatedness of items, Tavakol and Dennick (2011) and thus was used in the study. The alpha can take any value from zero (no internal consistency) to one (complete internal consistency). Clarkson (2015) agree that an alpha value of 0.7 should be the minimum figure of acceptability with 0.8 and above adding little to the scales reliability.

Consequently, for this research and in line with the arguments put forth by the foregoing authors, the minimum acceptable value of alpha was set at 0.7 for a measurement scale to be considered reliable. Variably a measurement scale with an alpha value greater than 0.9 may be considered very good (Churchill & Peter, 1984). The results for reliability in this study are as shown in Table 12.

Table 12: Reliability Analysis

No	Variables	Items	Cronbach Alpha	Remark
1	Change management	16	0.969	Reliable
2	Situational leadership	15	0.905	Reliable
3	Farmer characteristics	12	0.932	Reliable
4	Sugarcane Productivity	18	0.971	Reliable

The findings show that cronbach's alpha for all the items were all above 0.7 indicating that the instrument was adequately reliable for measurements and therefore was acceptable for the study. Since all the variables measured had a cronbach's alpha above 0.7, they were all reliable and thus accepted

4.4.3 Diagnostic Tests

The study conducted out different diagnostic tests to make sure that the postulations of Classical Linear Regression Model (CLRM) are not contravened and to select the appropriate models for investigation in the event (CLRM) postulations are violated. Thus, prior to running a regression model pre-estimation and post estimation tests have been conducted. The pre-estimation tests conducted in this case are the normality test, multicollinearity, heteroscedasticity and linearity tests. Each of them is discussed in the subsequent sections.

4.4.3.1 Normality Test

Test for normality determines if the data is well modelled and normally distributed (linear). Avioli (2012) showed that descriptive, normality, and verification tests could be assessed with the normal distribution. Singh and Masuku (2014) posit that if these tests show non-normality, then the data has either outliers, multiple modes, incorrect measuring tools, incorrect distributions, zero/infinite limits, or scanty collections. In order to fit a linear model, the dependent variable has to be normally distributed. The normality tests are many, they include Shapiro-Wilk test, Kolmogorov-Smirnov test and Anderson-Darling tests.

To test the normality of the variables, Shapiro–Wilk test was used as it has the highest power among all tests for normality. The hypothesis was tested at a critical value at 0.05, where the rule is that reject H_0 if the probability (P) value is less than 0.05 or else do not reject. The dependent variable should be normally distributed because the study was analyzed using a multiple regression model where the condition of normality must be satisfied (Quataroli & Julia, 2012). The hypothesis was that:

H_0 : The data is normal in distribution

H_1 : The data is not normal in distribution

The results for normality are as shown in Table 13.

Table 13: Test for Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Change Management	0.915	466	0.0505
Situational Leadership	0.820	466	0.0512
Farmer Characteristics	0.955	466	0.0752
Sugarcane Productivity	0.715	466	0.0766

Table 13 indicates that using the Shapiro-Wilk test of normality, the data is normal since the p-values are above 0.05 for all the variables and thus we do not reject the null hypothesis (H_0). The study concluded that the data for Change Management, Situational Leadership, Farmer Characteristics and Sugarcane Productivity are normal in distribution and hence subsequent analysis can be carried out.

4.4.3.2 Test for Multi-collinearity

Multi-collinearity is usually a situation in which there is a high degree of association between independent variables and dependent variable. The study used the independent average for each of the variables. Multi-collinearity was tested using variance inflation factor VIF in all the analysis and it ranged from 1 to 4 which would not be a cause of

concern, according to Alin (2010) who indicate that where $VIF \geq 10$ indicate presence of Multicollinearity.

Multicollinearity test was done where tolerance of the variable and the VIF value were used. Values more than 0.2 for Tolerance and values less than 10 for VIF means that there is no multicollinearity. Results for multicollinearity are as shown in Table 14.

Table 14: Multi-collinearity Test Using Tolerance and VIF

Variables	Collinearity Statistics:	
	Tolerance	VIF
Change Management	0.353	2.836
Situational Leadership	0.342	2.922
Farmer Characteristics	0.362	2.762

From the findings above all the variables had tolerance values >0.2 and VIF values <10 as shown in Table 4.9 and thus according to Myres (2015) who indicate that where $VIF \geq 10$ indicate presence of Multicollinearity, there was no multicollinearity among the independent variables.

4.4.3.3 Test for Heteroscedasticity

Heteroscedasticity is the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it. Running a regression model without accounting for heteroscedasticity would lead to biased parameter estimates. To test for heteroscedasticity, the Breusch-Pagan/Godfrey test was used. Heteroscedasticity test was run using Breusch-Pagan / Cook-Weisberg test in order to test whether the error terms are correlated across observations in the cross sectional of the data (Long & Ervin, 2000). The hypothesis was that;

H_0 : Data is not Homoscedastic.

H_1 : Data is Homoscedastic.

If the p-value is less than 0.05, the null hypothesis is rejected. Results are presented in Table 15.

Table 15: Heteroscedasticity Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
Ho: Constant variance		
Variable: fitted values of Sugarcane Productivity		
chi2(1)	=	5.24
Prob > chi2	=	0.417

Results in Table 15 show that the p-value is greater than the 5%. Then the null hypothesis was not rejected at a critical p value of 0.05 since the reported value was $0.417 > 0.05$ and thus the data did not suffer from heteroscedasticity.

4.4.3.4 Test for Linearity

Linearity assumes a straight-line relationship between the predictor variables and the criterion variable. This was assessed by examination of a scatter plot of all the independent variables against the dependent variable to measure if there is a straight-line relationship. All the independent variables depicted a straight-line relationship with the dependent variable as shown in Figure 3.

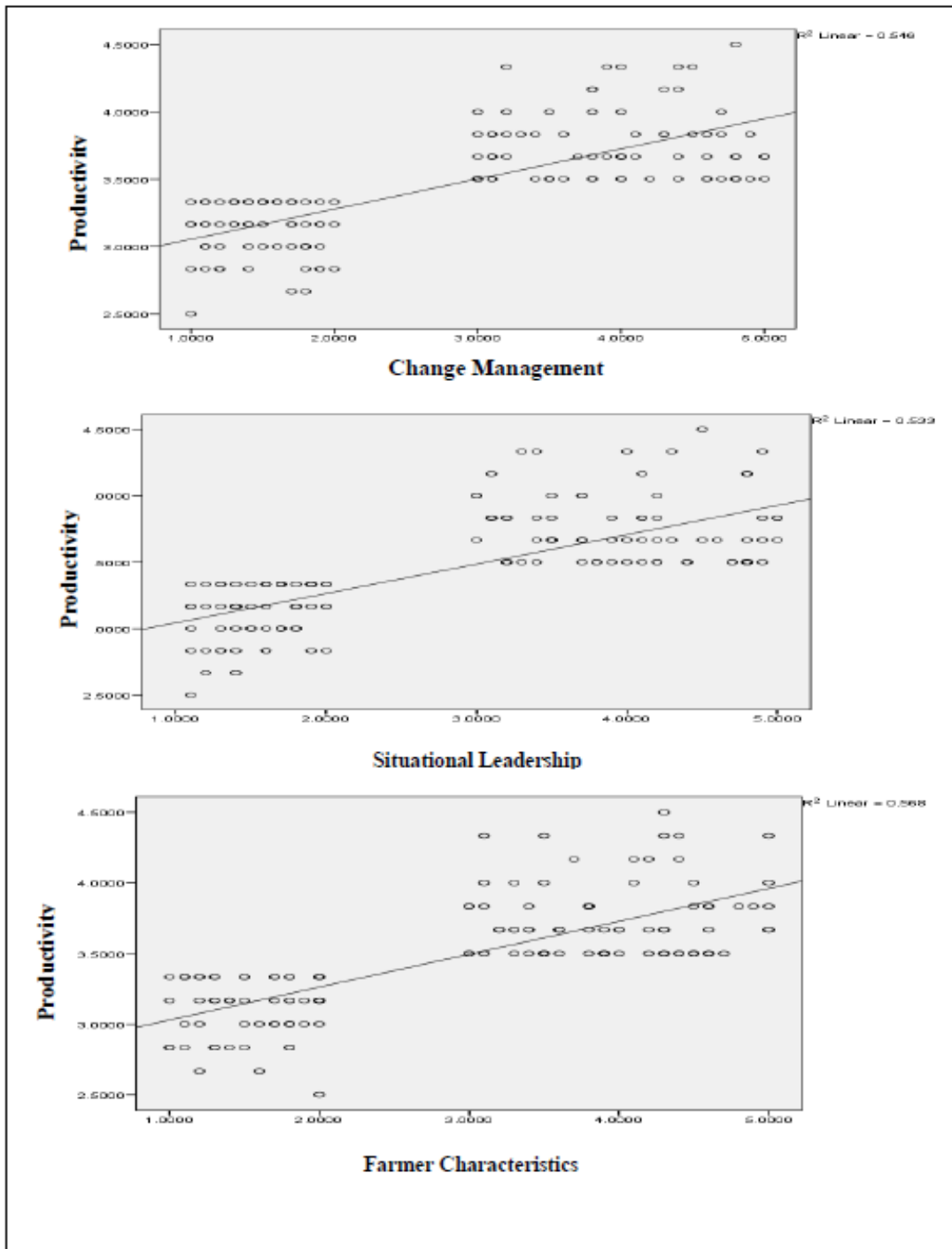


Figure 3: Scatter Diagrams

Figure 3 shows that the independent variables Change Management, Situational Leadership, Farmer Characteristics depicted a straight-line relationship with the dependent variable Sugarcane Productivity. In addition, the R square showed the percentage of the dependent variable variation that a linear model explains where all the variables were above 50%.

4.4.4 Factor Analysis

Factor analysis is an approach that involves condensing information contained in a number of variables into a smaller set of dimensions (factors) with a minimum loss of information (Baets, 2002). Using dimension reduction in SPSS, factor analysis was used to measure variables that cannot be measured directly, and to summarize large amounts of data. Mabert *et.al* (2003) stated that factor loading with Eigen values (total variance) greater than 0.5 should be extracted and coefficients below 0.49 deleted from matrix since they are not important. It is conducted in order to reduce the data to a meaningful and manageable set of factors (Sekeran, 2016). Eigen values are important as they allow us to reduce a linear operation to separate, simpler, problems. It also helps to analyze the structure of the interrelationships (correlations) by defining the factors. The factor analysis assumptions are that there are no outliers in data, no perfect multicollinearity, linearity and the data is in interval (Mabert *et.al* 2003) which were all met under diagnostic tests.

4.4.4.1 Factor Analysis for Change management

Factor analysis was carried out on the statements of change management. This was done by subjecting the statement to dimension reduction in SPSS where any sub variable with a value less than 0.5 was removed. The results are as shown in Table 16.

Table 16: Factor Loading for Change management

Change management	Extraction
There is inadequate sugarcane supply for our sugar industry	0.752
Undeveloped suitable sugarcane growing land may be used to help in the cane supply increase for a sugar factory.	0.591
Our factory supplies enough sugar to our markets in Kenya.	0.713
More money is required for sugar farms extension services for increase in cane yields.	0.831
Frequent farmer mobilization meetings may create successful sugarcane agricultural knowledge transfer for productivity.	0.618
Budgeted and monitored sugarcane farm meetings may be important for enhancement of sugarcane productivity.	0.672
Regular Sugarcane farm visits numbering at least 2 times per crop cycle may improve cane supply to mills.	0.691
Farmers need to keep a record of the extension farm visits for best follow up on improved cane yields.	0.555
Extension staff farm visits are less beneficial in sugarcane cultivation yield increase.	0.773
New sugarcane farming ideas from our researchers may not immensely improve sugarcane yields.	0.738
New sugarcane varieties help in attaining high yields for better cane supply.	0.708
Farmer organizations are a link to better cane yields not achieved now on farms due to poor advocacy.	0.608
Farmer organizations need to be supported financially by the government for sustainable miller- grower cane farming business.	0.435
Kenyan youths should be allowed early access to sugarcane cultivation land for increased cane yields.	0.702
Funds from sugar levy should be regularly spent on farms to have good cane yields.	0.850
Kenya youths access to Government Youth Fund for development of sugar cane may elevate sugar sub-sector sugarcane supply challenges.	0.649

According to Mabert *et al.*, (2003), factor loading with Eigen values greater than 0.5 should be extracted and below 0.5 not considered. Under Change management, all the sub variable were adopted as they had values greater than 0.5.

4.4.4.2 Factor Analysis for Situational Leadership

Factor analysis was carried out on the statements of Situational Leadership. This was done by subjecting the statement to dimension reduction in SPSS where any sub variable with a value less than 0.5 was removed. Table 17 shows the factor loading for Situational Leadership.

Table 17: Factor Loading for Situational Leadership

Situational Leadership	Extraction
No clear farming work plans from sugarcane extension leaders may cause sugarcane supply shortages at the sugar factories.	0.732
Poor sugarcane productivity may lead to poor business for farmers and millers due unsatisfactory extension service from extension service teams.	0.802
Deficient sugar farming extension service is a guarantee to business security in the Kenya sugar sub-sector.	0.576
Extension services leadership rewarding farmers enhance sugarcane productivity.	0.709
Poor extension services diminish cane yields of farmers.	0.594
Demotivated sugarcane farmers may be least interested in production of high sugarcane yields.	0.674
Sugarcane extension leaders focused well on best practice delivery could enable good yields of sugarcane to the farmers.	0.726
A consulting extension service leadership may allow a win- win relationship between miller and farmer parties for better liaison in high sugarcane productivity process.	0.582
The same type of consulting leadership may not be the best in high sugarcane yield attainments as the miller, and not farmers, take the bigger share of the agri-business proceeds demotivating the cane producers?	0.818
A tough or tasking sugarcane extension leadership forcing farmers to deliver on sugarcane productivity may effectively enhance sugarcane productivity on the farms.	0.645
The task leadership type in extension services is likely to allow better agribusiness for both farmers and millers.	0.690
Such a tough leadership may however lead to gradual sugarcane farming abandonment through leadership type dislike of better business terms to farmers	0.664
Well bonded teams of extension service leadership and farmers is what may be needed for greater enhancement of sugar cane productivity on farms?	0.752

Empowerment from team playing extension service may be necessary for farmers to observe best sugarcane farming practice for high sugarcane agribusiness from good yields.	0.722
Empowerment from extension service teams may never improve sugarcane yields as other hidden farming issues of the sugar industry could still cause low crop productivity.	0.782

The outputs in Table 17 show that all the statements on Situational Leadership had factor loading values greater than 0.5 and therefore they were accepted and thus no sub variable was dropped.

4.4.4.3 Factor Analysis for Farmer Characteristics

Factor analysis was conducted on the statements on Farmer Characteristics. This was done by subjecting the statement to dimension reduction in SPSS where any sub variable with a value less than 0.5 was removed. Table 18 shows the set of sub variables under the Farmer Characteristics.

Table 18: Factor Loading for Farmer Characteristics

Farmer Characteristics	Extraction
Our shared best cane growing experiences for recovery in cane supply to mills has been from our oldest farmers born in 1922-1943.	0.731
Respect to our extension service providers by our oldest influential farmers is likely to earn us special attention from our extension service providers for our improved sugarcane productivity.	0.560
The old sugarcane farmers may be outdated in farming methods that cause decline in cane supply to the mills.	0.672
Younger sugarcane farmers born in 1944-1960 character of encouragement to us all farmers could be a motivation to keep us together as we work on improved cane yields.	0.764
The same younger farmers yearn for better sugarcane farming standards that may be emulated by most of us cane farmers for better farming outcomes including yields for better incomes?	0.752
Farmers born 1944-1960 are limited in other cane farming characters responsible for enhanced sugarcane productivity.	0.713
More recently, born sugarcane farmers of period 1961-1980 greatly encourage all farmers to work hard in teams for attainment of better sugar cane yields	0.712
The farmers born 1961-1980 have techno- literate character that may help us get additional farming knowledge from internet in addition to that extensionists deliver, for even higher sugarcane yields.	0.676
The young farmers born in 1961-1980 may have deficient other character that may cause yield decline?	0.601
More recently born farmers of 1981-2000 have civic duty character that may assist in raising cane farmers man-hours for better sugarcane husbandry through creating awareness on COVID 19 health containment measures?	0.651
The youngest farmers show confidence in their sugar farming agribusiness and may inspire other farmers to do well also do well in their agribusiness.	0.637
The youngest farmers born 1981-2000 may be limited in other character types leading to decline in sugarcane productivity.	0.680

The outputs in Table 18 show that all the statements on Farmer Characteristics had factor loading values greater than 0.5 and therefore they were accepted and thus no sub variable was dropped.

4.4.4.4 Sugarcane Productivity

Factor analysis was conducted on statements on Productivity. This was done by subjecting the statement to dimension reduction in SPSS where any sub variable with a value less than 0.5 was removed. Table 19 shows the set of sub variables under the Productivity.

Table 19: Factor Loading for Productivity

Productivity	Extraction
Supply of sugarcane farming fertilizers like DAP and UREA is essential in achieving high sugarcane yields.	0.674
Extension visits may play a significant role in influencing the use of fertilizers for high sugarcane harvests.	0.853
Given limited availability of arable land, use of modern farming technologies are necessary to deliver on high sugarcane yields?	0.681
Farmer associations are likely to assist in advocacy for availing cheap supply of inputs for high sugarcane yield productivity.	0.772
Use of inorganic fertilizers may improve soil fertility for better sugarcane productivity.	0.635
Access to credit may influence fertilizer use in sugarcane farming for better yields.	0.717
There is probably sufficient soil fertility for farming sugarcane needs in my cane zone	0.830
The soil in our cane area is might be moderately fertile for sugarcane farming.	0.705
The rainfall in our cane farming area is always consistently reliable for good yields.	0.706
There is probably readily available farm mechanized assistance for better cane farming	0.735
The cost of cane farming inputs is sometimes not manageable for better yields.	0.681
Adequate farm labour availability is necessary in achieving good sugarcane yields.	0.731
Sugarcane farming may provide a steady source of income unlike other farming ventures.	0.751
Sugarcane farming could be self-sustaining due to good yields attained by farmers.	0.700
Intercropping other crops with sugarcane may improve sugarcane yields by providing cash for weed control.	0.699

Cane catchment area roads are likely to be adequately maintained by a miller for rapid farm inputs supply for improved sugarcane yields.	0.687
Sugarcane farming contracts disproportionately allow low payments to farmers causing poor cane husbandry for low sugarcane yields.	0.666
Provision of good quantity and quality seed-cane through credit to farmers may lead to good sugarcane productivity.	0.725

The outputs in Table 19 show that all the statements on Sugarcane Productivity had factor loading values greater than 0.5 and therefore they were accepted and thus no sub variable was dropped.

4.5 Descriptive Statistics

The purpose of descriptive statistics was to enable the study to meaningfully describe a distribution of scores or measurements using indices or statistics. The type of statistics or indices used depends on the type of variables in the study and the scale of the measurements. This section contains descriptive analysis for Change Management, Situational Leadership, Farmer Characteristics and Sugarcane Productivity. The mean showed the average values, the mode showed the most common value and the median indicate the middle number in set numbers.

4.5.1 Descriptive Statistics for Change Management

The first objective of the study was to determine the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The descriptive present the results for change management indicators; innovation, training, access to land, access to funds, strategic changes and operational changes as depicted in Table 20.

Table 20: Descriptive Statistics for Change Management

	N	Mean	Median	Mode	Std. Dev	Skewness	Kurtosis
Innovation	466	4.01	3.88	3.81	1.118	0.37	0.25
Training	466	3.99	3.82	3.72	1.158	0.32	0.23
Access to land	466	4.14	3.90	3.60	1.152	0.26	0.67
Access to funds	466	4.07	3.98	3.88	1.146	0.21	0.11
Strategic changes	466	4.09	4.06	3.96	1.139	0.32	0.15
Operational changes	466	4.15	4.04	4.01	1.137	0.21	0.19

The results from the Table 20 shows the descriptive statistics that indicates central tendency and dispersion of all the measures of Change Management. The total number of respondents in each measured was 466. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The measures of kurtosis and skewness are used to determine if indicators met normality assumptions (Kline, 2005). According to Bai and Ng (2005), if skewness is less than -1 or greater than 1, the distribution is highly skewed, if skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed, if skewness is between -0.5 and 0.5, the distribution is approximately symmetric.

The results show that innovation had a mean of 4.01, median of 3.88 and mode of 3.81. This implied that the mean of 4.01 implied that majority were agreeing with the statement on innovation. The standard deviation of 1.118 showed that the members of the group differed from the mean value of 4.01 for the group in the observation. Skewness for innovation was 0.37. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.25. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Training had a mean of 3.99, median of 3.82 and mode of 3.72. This implied that the mean of 3.99 implied that majority were agreeing with the statement on Training. The standard deviation of 1.158 showed that the members of the group differed from the mean value of 3.99 for the group in the observation. Skewness for Training was 0.32. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.23. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results indicate that access to land had a mean of 4.14, median of 3.90 and mode of 3.60. This implied that the mean of 4.14 implied that majority were agreeing with the statement on access to land. The standard deviation of 1.152 showed that the members of the group differed from the mean value of 4.14 for the group in the observation. Skewness for access to land was 0.26. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.67. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Access to funds descriptive results indicate a mean of 4.07, median of 3.98 and mode of 3.88. This implied that the mean of 4.07 implied that majority were agreeing with the statement on Access to funds. The standard deviation of 1.146 showed that the members of the group differed from the mean value of 4.07 for the group in the observation. Skewness for Access to funds was 0.21. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.11. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results indicate that strategic changes had a mean of 4.09, median of 4.06 and mode of 3.96. This implied that the mean of 4.09 implied that majority were agreeing with the statement on strategic changes. The standard deviation of 1.139 showed that the members of the group differed from the mean value of 4.09 for the group in the

observation. Skewness for strategic changes was 0.32. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.15. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results indicate that operational changes had a mean of 4.15, median of 4.04 and mode of 4.01. This implied that the mean of 4.15 implied that majority were agreeing with the statement on operational changes. The standard deviation of 1.137 showed that the members of the group differed from the mean value of 4.15 for the group in the observation. Skewness for operational changes was 0.21. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that innovation had 0.19. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

4.5.2 Descriptive Statistics for Situational Leadership

The second objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. The descriptive present the results for Situational Leadership under the indicators; club type, moderate type and task type and the results are shown in Table 21.

Table 21: Descriptive Statistics for Situational Leadership

Indicators	N	Mean	Median	Mode	Std. Dev	Skewness	Kurtosis
Club Type	466	4.12	3.83	3.72	1.105	0.220	0.160
Moderate Type	466	4.08	3.81	3.73	1.108	0.315	0.230
Task Type	466	3.96	3.76	3.68	1.198	0.238	0.367

The results from the Table 21 shows the descriptive statistics for Situational Leadership. The total number of respondents in each measured was 466. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The measures of kurtosis and skewness are used to determine if indicators met normality assumptions (Kline, 2005). According to Bai and Ng (2005), if skewness is less than -1 or greater than 1, the distribution is highly skewed, if skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed, if skewness is between -0.5 and 0.5, the distribution is approximately symmetric.

The descriptive results indicate that club type had a mean of 4.12, median of 3.83 and mode of 3.72. This implied that the mean of 4.12 implied that majority were agreeing with the statement on club type. The standard deviation of 1.105 showed that the members of the group differed from the mean value of 4.12 for the group in the observation. Skewness for club type was 0.2. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that club type had 0.16. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results indicate that the moderate type had a mean of 4.08, median of 3.81 and mode of 3.73. This implied that the mean of 4.08 implied that majority were agreeing with the statement on moderate type. The standard deviation of 1.108 showed that the members of the group differed from the mean value of 4.08 for the group in the observation. Skewness for moderate type was 0.315. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 0.230. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Lastly, the descriptive results indicate that the task type had a mean of 3.96, median of 3.76 and mode of 3.68. This implied that the mean of 4.08 implied that majority were agreeing with the statement on task type. The standard deviation of 1.198 showed that the

members of the group differed from the mean value of 3.96 for the group in the observation. Skewness for task type was 0.238. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 0.367. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

4.5.3 Descriptive Statistics for Farmer Characteristics

The third objective of the study was to determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The descriptive present the results for Farmer Characteristics under the indicators; Veterans Character, Baby Boomer character, Xers character, Nexters character and the results are shown in Table 22.

Table 22: Descriptive Statistics for Farmer Characteristics

Indicators	N	Mean	Median	Mode	Std. Dev	Skewness	Kurtosis
Veteran Character	466	3.92	3.84	3.74	0.157	0.039	1.170
Baby Boomer character	466	4.08	4.01	3.81	0.108	0.322	0.230
Xers character	466	4.24	4.18	4.02	0.059	0.181	1.630
Nexters character	466	4.40	4.15	4.03	1.103	0.219	1.030

The results from the Table 22 shows the descriptive statistics for Farmer Characteristics. The total number of respondents in each measured was 466. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion. The measures of kurtosis and skewness are used to determine if indicators met normality assumptions (Kline, 2005). According to Bai and Ng (2005), if skewness is less than -1 or greater than 1, the distribution is highly skewed, if skewness is between -1 and -0.5 or

between 0.5 and 1, the distribution is moderately skewed, if skewness is between -0.5 and 0.5, the distribution is approximately symmetric.

The descriptive results indicate that the Veterans Character had a mean of 3.92, median of 3.84 and mode of 3.74. This implied that the mean of 3.92 implied that majority were agreeing with the statement on Veteran Character. The standard deviation of 0.157 showed that the members of the group differed from the mean value of 3.92 for the group in the observation. Skewness for Veteran Character was 0.039. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 0.1170. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results indicate that the Baby Boomer character had a mean of 4.08, median of 4.01 and mode of 3.81. This implied that the mean of 4.08 implied that majority were agreeing with the statement on Baby Boomer character. The standard deviation of 0.108 showed that the members of the group differed from the mean value of 4.08 for the group in the observation. Skewness for Baby Boomer character was 0.322. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 0.230. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

The descriptive results for Xers character indicate a mean of 4.24, median of 4.18 and mode of 4.02. This implied that the mean of 4.24 implied that majority were agreeing with the statement on Baby Boomer character. The standard deviation of 0.059 showed that the members of the group differed from the mean value of 4.24 for the group in the observation. Skewness for Baby Boomer character was 0.181. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 1.630. Thus, we can conclude that the

values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Lastly, the descriptive results for Nexters character indicate a mean of 4.40, median of 4.15 and mode of 4.03. This implied that the mean of 4.40 implied that majority were agreeing with the statement on Nexters character. The standard deviation of 1.103 showed that the members of the group differed from the mean value of 4.24 for the group in the observation. Skewness for Nexters character was 0.219. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 1.030. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

4.5.4 Descriptive Statistics for Sugarcane Productivity

Descriptive statistics were carried out on Sugarcane Productivity in sugar factory cane catchments areas in Kenya. The descriptive present the results for sugarcane productivity under the indicators; Cane yield, Extension service, Cost of inputs, Labour and the results are shown in Table 23.

Table 23: Descriptive Statistics for Sugarcane Productivity

Indicators	N	Mean	Median	Mode	Std. Dev	Skewness	Kurtosis
Cane yield	466	2.96	2.84	2.71	0.269	2.900	1.730
Extension service	466	2.80	2.68	2.65	0.284	2.670	1.650
Cost of inputs	466	2.82	2.70	2.63	0.262	3.090	2.120
Labour	466	2.93	2.81	2.75	0.261	2.940	1.690

The results from the Table 23 show the descriptive statistics for Sugarcane Productivity. The total number of respondents in each measured was 466. Distribution of data was measured using skewness and kurtosis whereas central tenancy was measured using mean, median and mode. The standard deviation was used to measure dispersion.

The descriptive results indicate that Cane yield had a mean of 2.96, median of 2.84 and mode of 2.71. This implied that the mean of 2.96 implied that majority were disagreeing on the statements on Cane yield. The standard deviation of 0.269 showed that the members of the group differed from the mean value of 2.96 for the group in the observation. The standard deviation of 0.269 further implies that the data points tend to be very close to the mean of the data and a high standard deviation implies that the data points are spread over a wide range of the values. Skewness for Cane yield was 2.900. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that Cane yield had 1.730. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers. Cane yield was evenly distributed and the measure between the high and low score was small and exhibits normality Cane yield.

The descriptive results indicate that the Extension service had a mean of 2.80, median of 2.68 and mode of 2.65. This implied that the mean of 2.80 implied that majority were disagreeing with the statement on Extension service. The standard deviation of 0.284 showed that the members of the group differed from the mean value of 2.80 for the group in the observation. Skewness for Extension service was 2.670. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 1.650. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Further, the descriptive results indicate that the Cost of inputs had a mean of 2.82, median of 2.70 and mode of 2.63. This implied that the mean of 2.82 implied that majority were disagreeing with the statement on Cost of inputs. The standard deviation of 0.262 showed

that the members of the group differed from the mean value of 2.82 for the group in the observation. Skewness for Cost of inputs was 3.090. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 2.120. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

Lastly, the descriptive results indicate that the Labour had a mean of 2.93, median of 2.81 and mode of 2.63. This implied that the mean of 2.93 implied that majority were disagreeing with the statement on Labour. The standard deviation of 0.261 showed that the members of the group differed from the mean value of 2.93 for the group in the observation. Skewness for Labour was 2.940. Since the values were between -0.5 and 0.5, we thus conclude that the distribution is approximately symmetric. Kurtosis results showed that moderate type had 1.690. Thus, we can conclude that the values were platykurtic since they are less than 3 and thus had a broad tail distribution and no outliers.

4.6 Correlation Analysis

Correlation analysis was carried out to determine the association between the variables, Change Management, Situational Leadership, Farmer Characteristics and Sugarcane Productivity. The mean score for each of the independent variables was calculated and the Pearson's correlation obtained using SPSS. The correlations were done at 0.05 significance level with one asterisk (*) or a 0.01 significance level with two asterisks. To determine whether the correlation between variables is significant, one needs to compare the p-value to the significance level used. A significance level (denoted as α or alpha) of 0.05 works well. An alpha of 0.05 indicates that the risk of concluding that a correlation exists when, actually, no correlation exists is 5%. The p-value indicate whether the correlation coefficient is significantly different from 0 or not. When the p-value is less than or equal to 0.05 the correlation is statistically significant. However, if the p-value is greater than 0.05 or the significant level then correlation is not statistically significant (Statistics Solution, 2018). The correlation results are presented in Table 24.

Table 24: Correlation Matrix

Variables		Sugarcane Productivity	Change Management	Situational Leadership	Farmer Characteristics
Sugarcane Productivity	Pearson Correlation Sig. (2-tailed)	1.000			
Change Management	Pearson Correlation Sig. (2-tailed)	.750** 0.000	1.000		
Situational Leadership	Pearson Correlation Sig. (2-tailed)	.760** 0.000	.661** 0.000	1.000	
Farmer Characteristics	Pearson Correlation Sig. (2-tailed)	.761** 0.000	.645** 0.000	.554** 0.000	1.000

The results in Table 24 indicate that change management is positively and significantly associated with Sugarcane Productivity in sugar factory cane catchments areas in Kenya ($r= 0.750$, $p=0.00<0.05$). Situational Leadership is positively and significantly associated with Sugarcane Productivity in sugar factory cane catchments areas in Kenya ($r=0.760$, $p=0.00<0.05$). Farmer characteristics is positively and significantly associated with Sugarcane Productivity in sugar factory cane catchments areas in Kenya ($r=0.761$, $p=0.00<0.05$). Since the R-values were above 0.7, this is an indication that Change Management, Situational Leadership and Farmer Characteristics portrayed a high association with Sugarcane Productivity in sugar factory cane catchments areas in Kenya.

4.7 Hypotheses Testing

This section presents the findings of tests of hypotheses of the study. The hypotheses describe the relationship between variables of the study as conceptualized and presented in the conceptual model. The study focused on four objectives and four corresponding hypotheses **H₀₁**, **H₀₂**, **H₀₃** and **H₀₄** of the study (Table 5).

The first hypothesis, **H₀₁**: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya, was tested using simple regression model. The second, third and fourth wider study scope hypotheses: **H₀₂**,

H03 and **H04** (Table 5) were tested for by engaging moderation and mediating models with statistical approaches as suggested by Baron and Kenny (1986) and Hayes and Rockwood models (2020) appropriately. All tests were done at 5% significance level ($\alpha = 0.05$).

4.7.1 Change Management and Sugarcane Productivity

The first objective of the study was to determine the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. A simple regression model was used to test the statistical significance of the independent variable (Change Management) on the dependent variable (Sugarcane Productivity) in sugar factory cane catchments areas in Kenya. The first hypothesis stated in the null form is as follows;

H01: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya.

The hypothesis was tested by regressing change management and sugarcane productivity guided by the equation $SP = \beta_0 + \beta_1 CM + \varepsilon$

Where SP = Sugarcane Productivity, CM= Change Management.

Table 25: Model Fitness for Change Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750a	0.563	0.562	0.77146

As presented in the Table 25, the coefficient of determination R Square is 0.563. The model indicates that change management explains 56.3% of the variation in sugarcane productivity in sugar factory cane catchments areas in Kenya. This implies that there exist a high explanatory power between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

Table 26: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	355.724	1	355.724	597.699	.000b
Residual	276.152	464	0.595		
Total	631.876	465			

The Analysis of Variance (ANOVA) results are shown in Table 26. Analysis of Variance consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance. This was conducted using SPSS by using average mean score of change management and sugarcane productivity. The results in Table 4.27 indicate that F-Calculated (1, 464) = 597.699 which is greater than F-Critical (1, 464) = 3.84 at 95% confidence level. Therefore, the results confirm that the regression model of change management on sugarcane productivity is significant.

Table 27: Change Management and Sugarcane Productivity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.714	0.100		7.17	0.000
Change Management	0.751	0.031	0.750	24.448	0.000

The fitted model from the result is

$$SP = 0.714 + 0.751CM$$

This implies that a unit change in change management will increase sugarcane productivity in sugar factory cane catchments areas in Kenya by the rate of 0.751. H_{01} states that change management has no significant relationship with sugarcane productivity in sugar factory cane catchments areas in Kenya. Since, the p value $0.000 < 0.05$ is less than the critical value 0.05, the study rejected the null hypothesis that change management has no significant relationship with sugarcane productivity in sugar factory cane catchments areas in Kenya.

4.7.2 Moderating Effect of Situational Leadership

The second objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. Baron and Kenny (1986) moderation was used. The second hypothesis stated in the null form is as follows:

H₀₂: There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.

The moderating effect of Situational Leadership was assessed and results explained using coefficient of determination (R square), Analysis of Variance (ANOVA) and the regression coefficients. Hierarchical regression analysis was performed with an interaction term (a product of Change Management and Situational Leadership) introduced as an additional predictor. This was done in 3 steps.

Table 28: R² for Change Management, Situational Leadership and Productivity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750a	0.563	0.562	0.77146
2	.805a	0.648	0.646	0.69357
3	.819a	0.670	0.648	0.69204

The results in Table 28 shows that the R square for the moderating effect had varying values. The first model for regressing Change Management against sugarcane productivity had 56.3% while the second step of regressing Change Management and Situational Leadership against sugarcane productivity had 64.8%. The third step which regressed Change Management, Situational Leadership and the interaction term CM*SL against sugarcane productivity had 67%. The R square for model changed by 10.7 from 56.3% to 64.8% and 67% after the interaction term and thus it was concluded that Situational Leadership moderates the relationship between change management and

sugarcane productivity in sugar factory cane areas in Kenya. The null hypothesis, H_{02} , was rejected..

ANOVA results for Change Management, Situational Leadership and sugarcane productivity are as shown in Table 29.

Table 29: ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	355.724	1	355.724	597.699	.000
	Residual	276.152	464	0.595		
	Total	631.876	465			
2	Regression	409.153	2	204.577	425.278	.000
	Residual	222.723	463	0.481		
	Total	631.876	465			
3	Regression	410.615	3	136.872	285.792	.000
	Residual	221.261	462	0.479		
	Total	631.876	465			

The ANOVA results indicate that all the three models were significant at $0.000 < 0.05$. The F-Calculated for model one was $(1, 464) = 597.699$ which is greater than F-Critical $(1, 464) = 3.84$ at 95% confidence level. F-Calculated for model two was $(2, 463) = 425.278$ which is greater than F-Critical $(2, 463) = 2.995$ at 95% confidence level. F-Calculated for model three was $(3, 462) = 285.792$ which is greater than F-Critical $(2, 463) = 2.604$ at 95% confidence level. Therefore, the results confirm that the regression model one, two and three are significant. The regression of coefficients for Change Management, Situational Leadership and sugarcane productivity are as shown in Table 30.

Table 30: Regression coefficients for Moderating effect

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.714	0.100		7.140	0.000
	Change Management	0.751	0.031	0.750	24.226	0.000
2	(Constant)	0.385	0.095		4.053	0.000
	Change Management	0.409	0.043	0.409	9.512	0.000
	Situational Leadership	0.454	0.043	0.448	10.558	0.000
3	(Constant)	0.883	0.301		2.934	0.003
	Change Management	0.223	0.112	0.223	2.000	0.005
	Situational Leadership	0.267	0.115	0.264	2.322	0.021
	CM*SL	0.062	0.014	0.351	4.559	0.008

The regression of coefficients results shows that in step one, the regression model of Change Management on sugarcane productivity in sugar factory cane areas in Kenya was significant with $\beta=0.751$, $p=0.000<0.05$. In step two, the results show that the regression model of Change Management and Situational Leadership on sugarcane productivity in sugar factory cane areas in Kenya was significant with $\beta_1=0.409$, $p=0.000<0.05$; $\beta_2=0.45$, $p=0.000<0.05$. In step three, the results show that the regression model of Change Management, Situational Leadership and the interaction term CM*SL on sugarcane productivity in sugar factory cane areas in Kenya was significant with $\beta_1=0.223$, $p=0.005<0.05$; $\beta_2=0.267$, $p=0.021<0.05$; $\beta_3=0.062$, $p=0.008<0.05$.

The fitted models were:

$$\text{Model 1: } SP = 0.714 + 0.751CM$$

$$\text{Model 2: } SP = 0.385 + 0.409CM + 0.454SL$$

$$\text{Model 3: } SP = 0.883 + 0.223CM + 0.267SL + 0.062CM*SL$$

Where;

SP= Sugarcane Productivity

CM= Change Management

SL= Situational Leadership

CM*S= Change Management*Situational Leadership

The moderation analysis adopted the Baron and Kenny (1986) method. Results indicate that the P value of the interaction term (CM*SL) is $0.000 < 0.05$ and the R^2 increased by 10.7 from 56.3%, 64.8% and 67 % after the interaction term and thus, Situational Leadership moderates the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. The study thus rejected the null hypothesis and adopted the alternative hypothesis that there is a significant moderating effect of Situational Leadership in the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. The moderation effect was enhancing, since increasing situational leadership led to increase the effect of the predictor change leadership on productivity.

4.7.3 Mediating Effect of Farmer Characteristics

The third objective of the study was to determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The third hypothesis stated in the null form is as follows:

H₀₃: There is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

The mediating effect of farmer characteristics was assessed and results explained using coefficient of determination (R square), Analysis of Variance (ANOVA) and the

regression coefficients. The mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya was further analyzed in 4 steps.

Steps 1-3 was used to establish that zero-order relationship existed among the variables. Situations where one or more of the relations is non – significant depicts no possibility of mediation (Baron & Kenny, 1986). If they are significant relationships from step 1 through 3, one proceeds to step 4 where mediation is supported if the effect of change management (CM) remains significant after controlling farmer characteristics (FM). If farmer characteristics (FM) is not significant when change management (CM) is controlled, there is full mediation, and if both change management and farmer characteristics significantly predict sugarcane productivity (SP) there is partial mediation.

Table 31: R² for Mediating Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750a	0.563	0.562	0.77146
2	.745a	0.555	0.554	0.77311
3	.761a	0.578	0.578	0.75766
4	.809a	0.654	0.653	0.68688

The results in Table 31 shows that the R square for the mediating effect had varying values. The first step for regressing change management against sugarcane productivity had 56.3% while the second step of regressing change management against farmer characteristics had 55.5%. The third step which regressed farmer characteristics against sugarcane productivity had 57.8% and lastly the step that regressed change management, farmer characteristics against sugarcane productivity had 65.4%. The R squares for all the steps were above 50% and thus indicate a high level of variation between the variables.

Table 32 shows ANOVA for change management, farmer characteristics and sugarcane productivity.

Table 32: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	355.724	1	355.724	597.699	.000b
	Residual	276.152	464	0.595		
	Total	631.876	465			
2	Regression	345.921	1	345.921	578.751	.000b
	Residual	277.334	464	0.598		
	Total	623.254	465			
3	Regression	365.515	1	365.515	636.729	.000b
	Residual	266.36	464	0.574		
	Total	631.876	465			
4	Regression	413.429	2	206.715	438.134	.000b
	Residual	218.446	463	0.472		
	Total	631.876	465			

The ANOVA results indicate that all the four models were significant at $0.000 < 0.05$. The F-Calculated for model one was $(1, 464) = 597.699$ which is greater than F-Critical $(1, 464) = 3.84$ at 95% confidence level. The F-Calculated for model two was $(1, 464) = 578.751$ which is greater than F-Critical $(1, 464) = 3.84$ at 95% confidence level. The F-Calculated for model three was $(1, 464) = 636.729$ which is greater than F-Critical $(1, 464) = 3.84$ at 95% confidence level. The F-Calculated for model four was $(2, 463) = 438.134$ which is greater than F-Critical $(2, 463) = 2.997$ at 95% confidence level. Therefore, the results confirm that the regression model one, two, three and four are significant.

The results for the regression of coefficients for change management, farmer characteristics and sugarcane productivity are as shown in Table 33.

Table 33: Regression coefficients for Mediating Effect

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.714	0.100		7.17	0.000
	Change Management	0.751	0.031	0.750	24.448	0.001
2	(Constant)	0.678	0.1		6.794	0.000
	Change Management	0.741	0.031	0.745	24.057	0.000
3	(Constant)	0.751	0.095		7.883	0.000
	Farmer Characteristics	0.766	0.03	0.761	25.233	0.000
4	(Constant)	0.405	0.093		4.353	0.000
	Change Management	0.413	0.041	0.413	10.077	0.000
	Farmer Characteristics	0.456	0.041	0.453	11.059	0.000

The regression of coefficients results shows that in step one, the regression model of change management on sugarcane productivity was significant with $\beta=0.751$ $p=0.000<0.05$. In step two, the results show that the regression model of Change Management on Farmer Characteristics was significant with $\beta=0.741$, $p=0.001<0.05$. In step three, the results show that the regression model of Farmer Characteristics on sugarcane productivity was significant with $\beta=0.766$, $p=0.000$. In step four, the results show that the regression model of Change Management and Farmer Characteristics on sugarcane productivity was significant with $\beta_1=0.413$, $p=0.000<0.05$; $\beta_2=0.456$, $p=0.000<0.05$.

The fitted modes were:

$$\text{Model 1: } SP = 0.714 + 0.751CM$$

$$\text{Model 2: } FC = 0.678 + 0.741CM$$

$$\text{Model 3: } SP = 0.751 + 0.766FC$$

$$\text{Model 4: } SP = 0.405 + 0.413CM + 0.456FC$$

Where;

SP= Sugarcane Productivity

CM= Change Management

FC= Farmer Characteristics

Steps 1-3 were used to establish that zero-order relationship existed among the variables. Situations where one or more of the relations is non – significant depicts no possibility of mediation (Baron & Kenny, 1986). If they are significant relationships from step 1 through 3, one proceeds to step 4 where mediation is supported if the effect of change management remains significant after controlling farmer characteristics. If change management is not significant when farmer characteristics is controlled, there is full mediation, and if both change management and farmer characteristics significantly predict Sugarcane Productivity, there is partial mediation. Thus, step 1, 2 and 3 were met as the P-value were below 0.05. However, in step 4 the p value for corporate governance was below 0.05. Therefore, the study rejected the null hypothesis that there is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

4.7.4 Moderated Mediation Effect

The fourth objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics (Moderated Mediation). The fourth hypothesis stated in the null form was as follows:

H₀₄: The moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

Hayes and Rockwood (2020) model for moderated mediation was adopted.

Model 1: $SL = \beta_0 + \beta_1 CM + \varepsilon$

Model 2: $SP = \beta_0 + \beta_1 CM + \beta_2 SL + \beta_3 FC + \beta_4 SL * FC + \varepsilon$

Where;

SP= Sugarcane Productivity;

SL= Situational Leadership;

FC= Farmer Characteristics

SL*FC = Interaction term

β_0 = Constants

β_{1-3} = Coefficients

The effect was assessed and results explained using coefficient of determination (R square), Analysis of Variance (ANOVA) and the regression coefficients. Analysis of Variance consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance. The results are presented in Table 34.

Table 34: R² for Moderated Mediation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750a	0.563	0.562	0.77146
2	.828a	0.686	0.684	0.65574

The first model for regressing Change Management against sugarcane productivity had 56.3% while the second step of regressing Change Management, Situational Leadership, Farmer Characteristics and SL*FC against sugarcane productivity had 68.6%. The R square for model increased from 56.3% to 68.6% after the moderated mediating effect. The ANOVA results are presented in Table 35.

Table 35: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	355.724	1	355.724	597.699	.000b
	Residual	276.152	464	0.595		
	Total	631.876	465			
2	Regression	433.647	4	108.412	252.122	.000b
	Residual	198.229	461	0.43		
	Total	631.876	465			

Analysis of Variance consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance. The F-Calculated for model one was $(1, 464) = 597.699$ which is greater than F-Critical $(1, 464) = 3.84$ at 95% confidence level. The F-Calculated for model two was $(4, 461) = 252.122$ which is greater than F-Critical $(4, 461) = 2.371$ at 95% confidence level. Therefore, the results confirm that the regression model one and two are significant.

Table 36: Regression coefficients for Moderated Mediation Effect

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.714	0.100		7.17	0.000
	Change Management	0.751	0.031	0.750	24.448	0.001
2	(Constant)	0.469	0.28		1.678	0.094
	Change Management	0.279	0.044	0.279	6.335	0.000
	Situational Leadership	0.230	0.112	0.227	2.056	0.040
	Farmer Characteristics	0.250	0.111	0.248	2.25	0.025
	SL*FC	0.026	0.0034	0.143	7.60	0.045

The fitted model was:

$$\text{Model 1: } SL = 0.714 + 0.751CM$$

$$\text{Model 2: } SP = 0.469 + 0.279CM + 0.230SL + 0.250FC + 0.026SL*FC$$

Where;

SP= Sugarcane Productivity;

SL= Situational Leadership;

FC= Farmer Characteristics

SL*FC = Interaction term

The regression of coefficients results shows that in step one, the regression model of Change Management on Sugarcane Productivity was significant with $\beta=0.751$, $p=0.001<0.05$. In step two, the results show that the regression model of Change Management, Situational Leadership, Farmer Characteristics and the interaction term SL*FC on sugarcane productivity in sugar factory cane areas in Kenya was significant with $\beta_1=0.279$, $p=0.005<0.05$; $\beta_2=0.040$, $p=0.021<0.05$; $\beta_3=0.250$, $p=0.025<0.05$, $\beta_4=0.026$, $p=0.025<0.05$. Since, the p value for the Moderation mediating term (SL*FC) was significant $0.045<0.05$ was less than the critical value 0.05, the study rejected the null hypothesis that the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

4.8 Chapter Summary

This chapter presented the analysis of the data collected and discussion of the findings. The study utilized descriptive statistics, correlation analysis and regression analysis. The chapter also discussed the findings and summary of the hypothesis. The regression analysis results confirmed moderating effect of Situational Leadership and mediating effect of Farmers characterises on the relationship between change management and Sugarcane Productivity in sugar factory cane catchments areas in Kenya. The moderated mediating effect was also confirmed.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

The chapter presents the discussion of the research findings. The study sought to establish the relationship between change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. The tests were carried out using multiple regression analysis, correlation analysis and stepwise regression analysis. The tests were done at 5% significance level ($\alpha = 0.05$). The evaluation focused on the hypotheses derived from the objectives of the study.

5.2 Discussion of Findings

The results established that there was a positive and significant relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The study findings also revealed a significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. However, there exists partial mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. Further, the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

5.2.1 The Change Management on Sugarcane Productivity

The first objective of the study was to determine the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. A simple regression model was used to test the statistical significance of the independent variable (Change Management) on the dependent variable (Sugarcane Productivity) in sugar factory cane catchments areas in Kenya. The first hypothesis stated in the null form is as follows;

H₀₁: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya.

The hypothesis was tested by regressing change management and sugarcane productivity. The findings show that when change management are held constant, sugarcane productivity will remain at 0.714. At the same time, a unit increase in Change Management will increase sugarcane productivity in sugar factory cane catchments areas in Kenya by the rate of 0.751. The null hypothesis of the study was that Change Management has no significant relationship with sugarcane productivity in sugar factory cane catchments areas in Kenya. Since, the p value was less than the critical value 0.05, the study rejected the null hypotheses and thus Change Management has a significant relationship with sugarcane productivity in sugar factory cane catchments areas in Kenya.

The findings agree with Kimhi and Oliel (2019) who studied change management and organizational productivity in selected manufacturing companies. The study findings revealed that change management strategies had a positive and a statistically significant effect on organizational productivity. The results also indicate a correlation between leadership changes and productivity. The findings are consistent with Kurgat (2019) whose study on the relationship between change management and organizational productivity of media companies in Kenya and findings were statistically significant for the relationship between change management and productivity of Kenyan media firms. The findings are in line with those of Al-Jaradat, Nagresh, Al-Shegran and Jadellah (2013) whose study on the relationship between change management and productivity indicate a statistically significant relationship between change management and productivity. Study outcomes by Sung and Kim (2021) on the effect of change management on organizational productivity indicated that change management factors have a positive effect on innovative behaviour and organizational productivity. In addition, public officials' innovative behaviour played a mediating role between change management and organizational productivity. It was confirmed that the innovative behaviour of organizational members is essential to achieve organizational productivity.

Among the factors of change management, participation and communication had the highest influence on innovative behaviour and organizational productivity. Similar findings by Olajide (2014) on change management and its effect on organizational productivity of Nigerian telecoms industries revealed that changes in technology had a significant effect on productivity and that changes in customer taste has a significant effect on customers' patronage. The result also shows that changes in management via leadership have significant effect on employee's productivity.

Nyasha (2017) examined the impact of organisational change and established that change management and employee involvement and indicated that the change vision was not communicated, while employee involvement was minimal in all stages of change processes. The findings are in line with Ahmed, Rehman, Asad, Hussain and Bilal (2013) who examined the impact of organizational change on the productivity and showed that organizational change had a positive significant impact on productivity in the banking sector. The findings are also consistent with those of Safo-Adu (2014) conducted a study on the role of change as an organizational improvement and found that the sources of resistance to change were primarily from blind resistance, intellectual (ideological) resistance and political resistance. Further, personnel training was found to be the factor with the highest effect on successful implementation of and acceptance of change. The findings concur with those of Ugwu, Osioma, Onwuzuligbo and Nnaji-Ihedinmah (2020) who conducted a study to examine the effect of change management on the productivity of deposit banks in Imo State. The study found that change management had a positive and significant effect on the productivity of banks in Owerri City, Nigeria. In addition, the findings of this study agree with results of Kimutai (2017) who sought to establish the strategies of change management and their effects on the effectiveness of an organization. The study established that there was a significant relationship between the automation of office operations and the effectiveness of the organization. The study also found that there was a significant relationship between the development of staff and organizational effectiveness. Additionally, the study established that there was a positive

and significant relationship between the engagement of stakeholders at the University of Eldoret and the effectiveness of the institution as a whole.

The results of this study agree with those of Koitie (2015) who sought to examine the influence of strategic change management practices on the productivity of Constitutional Commissions in Kenya. The study found that effective and strategic change had a positive and significant effect on the performance of constitutional commissions in Kenya. The findings of this study are in line with those of Shahzad and Abdulai (2020) that analysed the adaptation of farmers to extreme weather conditions through climate smart farm practices (CSFP) and to establish the effects of the adaptation strategies on the performance of the farmers. The adoption of those strategies resulted in a significant increase in the amount of returns for the farmers. The adoption of the CSFP strategies practices by the famers also resulted in a significant decline in the volatility of the net farm returns and as such the farmers' exposure to downward risk. Similarly, the study found that having access to extension services as well as access to good education for the members of farming households has a positive influence on the probability of famers adapting the CSFP policies.

The findings of this study back those of Karimi (2019) that sought to investigate the strategies of change management and the productivity of the employees in the county of Meru. The study found that there exists a positive and significant relationship between the change management strategies including providing incentives, alternative work discipline interventions, organizational culture and the productivity of employees at the County Government of Meru. The findings are also in line with Kang (2015), who conducted a study to assess the concept of change management as one of two forms. A macro change environment or a micro change environment. Macro change involves situations where vast changes occurred in an organization either internally, externally or a combination of both. Micro change focuses instead on a component of change and the process of implementing the change. As such, change management must be well defined so as to apply the right approach in change management.

In addition, the results of the study align with those of Harrison (2017) that sought to assess the role of data in practices of change management and their effect on the productivity and sustainability of farms. The study found that the more data is used, the more effect they have on the practices of change management. The study further established that when the use of data is applied in change management, then change management has a significant effect on the productivity of employees. The findings are also in agreement with the outcome of Irungu (2017) who conducted a study to examine the change management practices adopted by Equity Bank. The study found that Equity Bank institutes and uses multiple change management practices. The study recommends that Equity Bank should set up a strategy of flexible organizational structure so that all departments are linked and can enhance rapid decision making and promotes delegation within the organization. The study found that there is a significant relationship between the practices of change management and performance of the staff at Equity Bank.

The findings concur with those of Kipsha and Koech (2020) who conducted a study to assess the effects of strategic change management on the productivity of government owned entities. The results of the study indicated that a significant number of government owned entities were led by strategic leaders who motivated the employees towards achieving the goals of the organization. The study also revealed that there was strong cultural integration in the parastatals and that the employees from different departments all shared a similar perspective. A majority of the parastatals had strong corporate communication thus helping the organization to run smoothly and successfully. The study therefore concluded that strategic leadership change, strategic corporate communication change, strategic cultural integration change, as well as strategic resource allocation change had a positive impact on the productivity of government owned entities in the county of Mombasa. The findings of the study are in agreement with those of Makanga (2019) who conducted a study to examine how the leadership at the Technical University of Kenya (TUK)'s Library initiate and manage change. The study found that change in information technology, the change in the economy as well as a change in the educational and learning environment had a significant effect on the productivity of the library. The

study also found that training of staff and development of capacity had a significant and positive effect on the performance of the library at the Technical University of Kenya (TUK).

The findings of this study are in line with the findings of Simiyu (2018). He conducted a study to investigate the effects of project management on agricultural projects by community based organizations in Bungoma County. The study found that project planning, project implementation, M & E and communication all had significant effects on the performance of projects. The study also found that the external environment as a moderating variable also had an effect on the relationship between the practices of performance meant to effect change and project performance. Further, the findings are also in agreement with Musau (2012) who conducted a research study to examine the management of strategic change at Safaricom Limited. The study found that Safaricom Limited had experienced some strategic changes and applied certain change management practices to effect such changes. The study concluded that Safaricom Ltd has properly managed strategic and operational change even though they faced significant challenges in doing so. The company managed to keep up with the changing business and organizational environment. The Mpesa platform has improved leading to more people carrying out transactions and an improvement in customer satisfaction levels and consequently an increase in the number of subscribers. The employees at the organization especially those at operations level have also been largely motivated leaving Safaricom Ltd as a respected and reputable company not only in the telecommunications industry but in general and not only in Kenya but the East African region at large.

The findings agree with Kimhi and Oliel (2019) whose study on change management and organizational productivity in Manufacturing Companies found that changes have a positive significant effect on organizational productivity in manufacturing companies. Change management strategies have a positive significant effect on organizational productivity in manufacturing companies. Leadership changes have a positive significant influence on organizational productivity in manufacturing companies. The results concur

with the findings of Mukhebi (2019) conducted a research study to investigate the effect of change management on the performance of employees in commercial banks in Kenya's Trans Nzoia County. The findings of the analysis indicated that technological change, downsizing, structural change and organizational culture all have significant effect on the performance of employees in commercial banks. As such, the study concluded that change management had a significant effect on the performance of employees in the commercial banks in Trans Nzoia County. The study recommended that the management of the banks undergoing organizational change should emphasize on strategies of communication and participatory leadership in order to make the employees ready for change. The study further recommended that commercial banks should aim to become learning organization and to promote a change of attitudes to support organizational change management.

The findings indicated that the null hypothesis H_{01} should be rejected. Therefore, in this sugar sector study change management would be of benefit to farmers in sugarcane producing areas. The study would offer valuable insight about the culture and structure of such organizations, downsizing and change in technology. However, change requires teams that bring it about area endowed with financial and other resources to avoid mainstreaming failure for a new business focus. In general, the findings would also be of use to future researchers keen to further study the impact of change management on the performance of employees in such organizations.

5.2.2 The Influence of Situational Leadership as a moderator on the relationship between change management and sugarcane productivity

The second objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. The second hypothesis stated in the null form is as follows: H_{02} : There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.

The moderating effect of Situational Leadership was assessed and results explained using coefficient of determination (R square), Analysis of Variance (ANOVA) and the regression coefficients. Hierarchical regression analysis was performed with an interaction term (a product of Change Management and Situational Leadership) introduced as an additional predictor. This was done in 3 steps. The regression of coefficients results show that in step one, the regression model of Change Management on sugarcane productivity in sugar factory cane areas in Kenya was significant. In step two, the results show that the regression model of Change Management and Situational Leadership on sugarcane productivity in sugar factory cane areas in Kenya was significant. In step three, the results show that the regression model of Change Management, Situational Leadership and the interaction term CM*SL on sugarcane productivity in sugar factory cane areas in Kenya was significant. Since the P value of the interaction term (CM*SL) is $0.000 < 0.05$ and the R^2 increased from 56.3%, 64.8% and 67% after the interaction term and thus, Situational Leadership moderates the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. The study rejected the null hypothesis and adopted the alternative hypothesis that there is a significant moderating effect of Situational Leadership in the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.

The results agree with those of Ghazzawi, Shoughari and Osta (2017) who looked at the situational leadership and its effectiveness in rising employee productivity and revealed a positive relationship between situational leadership and employee productivity. The findings are also consistent with those of Raza and Sikandar (2018) on the relationship between leadership style and students' productivity whose results reported significant influence of situational approach on students' productivity. The situational approach had a strong positive a statistically significant effect on students' productivity. Ruslan, Lian and Fitria (2020) studied the relationship between principal's situational leadership and teacher's professionalism and results .The outcome showed a statistically significant relationship between principal's situational leadership and teacher's productivity. The

findings also revealed that there is significant relationship between teacher's professionalism and teacher's productivity. The results are in tandem with those of Rahadiyan, Triatmanto and Respati (2019) who examined the effect situational leadership style towards employee productivity. The outcome was that good situational leadership had a positive effect on productivity through job satisfaction. Similarly a study by Ghazzawi, Shoughari and Osta (2017) on Situational leadership and its effectiveness in rising employee productivity established an enhanced relationship between the leadership and productivity. Further Kitonga (2017) studied Situational leadership and productivity reported significant positive correlation between the leadership practices in general and productivity sustainability in not-for-profit organizations. Specifically, the study findings established positive correlations between determining strategic direction, developing human capital, ethical practices, strategic control and productivity.

Nanthagopan (2016) who examined the impact of Situational leadership and management capability on organizational productivity and has results showing that, leadership and management capability accounted for coefficient for determination of organizational productivity. Moreover, findings by Momanyi and Juma (2015) in a study on effect of Situational leadership style on employee productivity in Kenya energy sector parastatals show a positive influence on employee productivity. In addition, Dumas and Beinecke (2018) carried out a study on the interactions of vertical and shared leadership in projects involving change management. The study found out that vertical and shared leadership both have a need to deal with change as leadership behaviours complement each other to meet the demands of a project. Consequently, they recommended that leaders be developed and trained to equip them with numerous effective leadership skills for application as necessary in the right contexts.

The results of the study are in line with Njeri (2017) who undertook a research study to determine the effects of strategic leadership types on the performance of coffee cooperative societies in Kenya's Nyeri County. In particular, the study was to investigate visionary, transformational, situational and transactional leadership effect on the

performance of the coffee cooperative societies. The study found that there was a positive and significant relationship between the strategic leadership types and the performance of coffee cooperative societies. The study concluded that these leadership types were needed but challenges associated with them be identified for coffee society management committees understanding prior to beneficial engagement.

The results are also in line with those of Alsaqqa (2020) who sought to address the benefit of situational leadership in dealing with the context of healthcare organizations. The study established that situational leadership needs one to create collaboration within the organization by pooling the knowledge of all staff together, defining the discussions to be held and to ask critical questions. The study established that situational leadership had a significant effect on the performance of healthcare organizations. The study further concluded that leaders should be equipped with situational leadership skills for the enhancement and improvement of healthcare in health organizations. The findings are in agreement with those of Kung'u (2019) who conducted a study to examine the leadership styles on change management among county governments with the moderating variable for the study being organization culture. The study established that there was a positive and significant correlation between transformational leadership and change management. The study also showed a positive relationship between transactional leadership and change management. The study found that there was a negative correlation between laissez-faire leadership and change management. There also existed a positive and significant association between autocratic leadership and change management. Finally, the study showed that there was a positive correlation between democratic leadership and change management. The study concluded that transformational leadership had a significant effect on change management in Kenyan county governments. The study also concluded that transactional leadership had a significant effect on change management in County governments in Kenya. Further, the study concluded that laissez-faire leadership had an effect on change management in Kenyan counties and that autocratic leadership had an impact on the change management of Kenyan counties. Finally, the research study concluded that democratic leadership had an influence on change management in county

governments and that organizational culture as a moderating factor had an influence on the relationship between leadership styles and change management. This implies that applying different leadership models depending on the situation had a significant benefit on productivity as shown by the findings of this study.

The results of the study back those of Akinbode and Al Shuhumi (2018) who discussed change management and different styles of leadership. The paper recommended that institutions of higher learning turn to learning organizations and adopt the transformational style of leadership if the change management process is to be effective. The adoption of these change initiatives will enable them to meet the needs of society and stay relevant in the industry. The study recommends that the change process should be carried out diligently and follow the necessary preliminary tasks to increase the chances of success. The study concluded that whether change initiatives succeed or fail is dependent on how well the leaders made preparations for themselves and the institutions as a whole in readiness for change since employing situational leadership was found to have a significant and positive impact on the performance of organizations.

The study findings are in agreement with those of Kavanagh and Ashkanasy (2016) who sought to establish the impact of leadership and strategy of change management on organizational culture. The findings from the study indicate that there is a significant effect of situational leadership on organizational culture and performance. In a lot of cases, the changes caused by mergers are imposed on the leaders and the process of reinventing the organizational culture is often hindered by the speed with which such changes occur. As a result, the success or failure of any organizational mergers is dependent on personal perceptions regarding the handling of the change process as well as the direction in which the culture is moving. It is important that there is communication between all stakeholders and that the process is transparent to all since this often decides how a leader is perceived and who is perceived as a leader in the first place. Leaders should show competence and consistency in the process of effecting change so that the employees within the organization accept the changes set out by the

merger. The results of the study are in line with Belias and Koustelios (2014) findings. The two investigated the effect of leadership and change management strategy on organizational culture. The study presented the notion of culture and defined organizational culture. The study examined organizational culture and defined the role of a leader. The findings of the study imply that leadership is closely linked to organizational culture mainly through the processes of outlining a certain vision and setting out the expectations. This paper provided an explorative and theoretical reference through a bibliography that can be used to guide further research. The paper offers management and future researchers a framework on the importance of management strategy.

The study findings agree with those of Mustofa and Muafi (2021) who sought to examine and analyze the effect of situational leadership on the performance of employees by the job satisfaction and organizational citizenship behaviour of the employees. The results of the study showed that situational leadership had a significant and positive effect on the job satisfaction of employees. Situational leadership also had a positive and significant impact on the Islamic organizational citizenship behaviour of the employee. The study also found that situational leadership has no effect on employee performance and that situational leadership has a positive and significant influence on the employee performance. Situational leadership was found to have a positive and significant influence on employee performance and finally, situational leadership was found to have a positive and significant effect on the performance of employees mediated by job satisfaction and Islamic organizational citizenship behaviour.

The results of Wanza and Nkuraru (2016) who conducted a study to investigate the effects of change management on employee performance in the University of Eldoret. Are in agreement with this study outcome. Their study changes focused on in their study were technology, organizational leadership, structure and culture. The findings of the study indicated that structural changes and organizational leadership positively influence the performance of employees. The study also revealed that technological changes have a

large effect on the performance of employees as a result of the rapid changes in technology that eases employees workload, enhances work efficiency and effectiveness within the organization. The explanation for this was a strong organizational culture encourages teamwork and enhances the performance of employees. This results in improved synergy and momentum towards achieving the objectives of the organization. The study made the conclusion that structural changes, technology, leadership and organizational culture all positively influence employee performance. The findings of the study are in agreement with Kinoti (2015) who conducted a study to investigate the effects of change management on the performance of employees at the Co-operative Bank of Kenya. There was a significant relationship between change management and the performance of employees. The study established that the manner in which a leader makes decisions, delegates responsibility to other staff and interacts with other employees has an effect on the organization performance as a whole. The study further showed that by embracing and adopting new technology, the performance of employees had significantly improved. The study concluded that the type of leadership used at The Co-operative Bank of Kenya was an autocracy that allowed for some democracy.

The findings of the study are also in agreement with Wachira and Anyieni (2017) who sought to establish the influence of change management on the performance of the Teachers Service Commission (TSC) in Kenya. The research study concluded that communication had a positive effect on the performance of the Teachers Service Commission. The study further concluded that communication had a significant influence on TSC performance and made recommendation that the TSC should establish better systems of communication within its organizational structure to enhance communication and consequently improve performance.

The results of the study are also in line with Aksu (2014) who examined situational leadership among different generations. The study found that companies utilize only a third of their human resource in the best case scenario. It is observed that the team leading the changes generally consist of individuals who are committed to their work.

Given that this is often a low percentage of the entire staff, this results in a slow adaptation of the change in the organization. The results showed that the leaders have a lot of work with regards to effecting change or improving the commitment of employees to their jobs. The literature review in the study implied that an appropriate style of leadership could successfully implement what is needed. The study recommended the implementation of Hersey-Blanchard Situational Leadership behaviour as it could have a significant impact on the performance of employees within the organization. The findings agree with Francisco and Nuqui (2020) who studied the emergence of situational leadership during the Covid-19 pandemic among school administrators in the Philippines. The findings of the study through data analysis revealed that new normal leadership can be described as the capacity to adapt while maintaining the same commitment and that new normal leadership entails being an instructional decision maker. The study also found that new normal leadership is about a leader who can plan well, is vigilant and initiates change. The study recommended that this theory be tested further through the quantitative approach to make confirmations and carry out future examinations in more depth.

5.2.3 The Influence of Farmer Characteristics as a Mediator on the Relationship between Change Management and Sugarcane Productivity.

The third objective of the study was to determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The third null hypothesis **H₀₃** stated that there is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.

The mediating effect of farmer characteristics was assessed and results explained using coefficient of determination (R square), Analysis of Variance (ANOVA) and the regression coefficients. The mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane

catchments areas in Kenya was further analysed in 4 steps. The regression of coefficients results shows that in step one, the regression model of change management on sugarcane productivity was significant. In step two, the results show that the regression model of Change Management on Farmer Characteristics was significant. In step three, the results show that the regression model of Farmer Characteristics on sugarcane productivity was significant. In step four, the results show that the regression model of Change Management and Farmer Characteristics on sugarcane productivity was significant.

Steps 1-3 were used to establish that zero-order relationship existed among the variables. Situations where one or more of the relations is non – significant depicts no possibility of mediation (Baron & Kenny, 1986). If they are significant relationships from step 1 through 3, one proceeds to step 4 where mediation is supported if the effect of Change Management remains significant after controlling Farmer Characteristics. If Change Management is not significant when Farmer Characteristics is controlled, there is full mediation, and if both Change Management and Farmer Characteristics significantly predict Sugarcane Productivity, there is partial mediation. Thus, step 1, 2 and 3 were met as the P-value were below 0.05. However, in step 4, the P-value for corporate governance was below 0.05. Therefore, this indicate that there exist a partial mediation effect on the mediating role of farmer characteristics on the relationship between change management and sugarcane productivity.

The results agree with Nkari and Kibera (2016) who looked at the relationship between farmer characteristics and productivity and the study findings revealed significant relationship between farmer characteristics and productivity. Yield enhancing characteristics will influence cane farming practice on sugarcane productivity (Wanyonyi, 2016). The findings by Guo, Wen and Zhu (2015) on the impact of aging agricultural labor population on farmland output: from the perspective of farmer characteristics showed that changes in the working-age households have a significant impact on agricultural output. The study also found that elderly farmers who do not intend to abandon farming had higher agricultural output compared to other farmers. This

indicates that the adverse effects of changes in the agricultural population age result more from the agricultural output of older farmers who intend to give up farming. This intention adversely affected other elements and reduced investment. Therefore, various forms of training should increase efforts to cultivate modern professional farmers and policies should be simultaneously developed to increase agricultural production levels.

The findings are consistent with Kassem and Sarhan (2013) who studied the effect of job characteristics on satisfaction and productivity and the results revealed that productivity was not related to the core job dimensions while satisfaction was. The study posited that the managers agricultural extension system needed put job characteristics into consideration for job redesign to enhance satisfaction and productivity of extension agents. The findings by Senen, Masharyono and Edisa (2020) study on the effect of job characteristics to employee's productivity also found a positive influence between job characteristics on employee productivity.

However, the findings by Wangechi (2014) on the effect of multi-generational workforce on employee productivity found differences between the mean scores of the perceptions of Millennials (18-33 years), Generation Xers (34-48 years) and Baby Boomers (49-60 years) was not statistically significant at ($p < .05$) level in all the dimensions of employee relations practices. The study concluded that employee productivity did not vary with multi-generational perceptual differences with regards to the various dimensions of human resource development practices at the company. Further, Cekada (2012) noted that each generation thus has unique characteristics, influences, work ethics, core values, and respect and tolerance for others that affect how its members interact, communicate and learn in the workplace. Huggins (2010) considered generation X as valuing flexibility, opportunity to grow and develop, quality products or services, efficient processes and competent people. Generation Yers are characterized as loving fun and flexibility, opportunities to continue learning, corporate responsibility, up-to-date technology and collaboration. The findings by Lien, Kumbhakar and Hardaker (2018) on how famers' characteristics influences productivity and technical efficiency at the farm

level did not find any evidence of off-farm work share affecting farm productivity the predicted off-farm work share was not statistically significant. In other words, we did not find any systematic difference in farm productivity and technical efficiency between part-time and full-time farmers.

The findings are in agreement with Hansen and Jervell (2015) who sought to establish how dairy farmers manage change as a result of the changes in policy and the introduction of automated milking systems (AMSs) in the dairy industry of Norway. The results showed that new farming systems and technology can be adopted on farms and yield varying results. Continuous and gradual change, intentional use of consultants and the careful planning of joint farming positively and significantly impact the performance of farming during and after the effecting of the change. The study also found that change should be seen as a managerial challenge and not just as the implementation of new technology. The results of the study are in line with Wachira (2012) who conducted a study to examine how Kenya Tea Development Agency (KTDA) practiced change management and the effects and impact on the performance of the company as a whole. The study was based on the fact that a lot of organizations have benefited from innovation and have become more competitive. KTDA has a mission to offer effective management to those in the tea industry. These management services involve efficient production, processing and marketing of quality tea products. They also include investments in related ventures for the benefit of investors, shareholders and other stakeholders. The study established that KTDA had gone through a process of restructuring where a number of changes had occurred in staff positions, management, changes in staff remuneration, decentralization, products and services, change in the attitudes of the employees, advancement of technology and evolution of business units into subsidiaries of the KTDA. The changes in the organization were effective and resulted in an improvement of the performance and profitability of KTDA. The research study recommended that proper communication to the employees in the organization reduced the chances of resistance and improves chances of acceptance. The policies of

the organization are readjusted to reflect the legal requirement that subsidiary units should be recognized as independent bodies.

The findings of the study agree with Muchangi (2016) who conducted a study to assess the effect of farmers' social economic characteristics, the agricultural extension and technology on enhancing the adoption of organic farming among trained farmers in Embu County in Kenya. The study was based on the fact that training of farmers is intended on promoting their knowledge and skills, changing their attitudes and enabling them to achieve their goals. Among those who adopted the technology, 60% of them reported an increase in their harvest per acre when compared to previous seasons prior to their adoption of entire organic farming. Generally, the factors influencing the adoption of Organic Farming technologies in Embu County were technology related and economic constraints as opposed to the social attributes of the farmers. The findings of the study provided important information that can be used to assess the impact and effectiveness of the farmers training project as well as its sustainability. The results offer useful information and recommendations to guide future researchers and institutions looking to train farmers.

The results of the study are in agreement with Martínez-García, Ugoretz, Arriaga-Jordán and Wattiaux (2015) who sought to explore whether the adoption of technology and the changes in management practices were associated with households, the structure of the farm and farmer characteristics. The study also sought to identify processes that may boost productivity and sustainability of dairy farming in Mexico. The study used factor analysis of data from 44 small-scale dairy farmers established that 3 variables, farm-size, farmer's engagement and household structure was cumulatively responsible for 70% of the variance. The availability of networks and membership in a community of peers were seen as important factors that contributed to the success of farmers. Smallholders were more attracted to technologies that are easy to implement and give immediate benefits. The farmers who did not use high investment technologies found gem unaffordable due to the cost, insufficient farm sizes, a lack of know-how and unreliable electricity.

The findings are consistent with Kinyangi (2014) who sought to establish the factors that impact the adoption of agricultural technology among the small scale farmers of Kakamega North Sub-County. The study's conceptual framework guided the study by showing how the variables involved in the study relate to each other. The study revealed that capital and credit facilities had a positive and significant relationship with the adoption of agricultural technology, the results also indicated that training has a marginally positive and significant effect on the adoption of technologies among small scale farmers. The study also found that there was a marginally positive association between the availability of agricultural extension services and the adoption of agricultural technology. The results further revealed that the availability of markets had a positive and significant effect on the adoption of agricultural technology. The study results also revealed that the demographics of the farmers i.e. the gender, age, educational levels have a significant effect on the adoption of technology. The variable on gender had a positive effect on the adoption of technology but it was insignificant. Based on these findings, the study recommended that the farmer's capital and credit facilities should be improved so that such services are readily accessible to the farmers. The famers and extension officers should also be trained to on how to use such technologies to raise farming yields. Conservation technologies and other technologies that can lead to an increase in the productivity of the farmers. The findings of this study may prove the need to increase the standards of living by improving their production of capacity.

The findings are in line with Wilson (2014) who established the farmers' characteristics that result in improved and high farm business performance in the UK. The study results indicated that such farmers typically have agricultural qualifications, have a variety of information sources and can easily identify and capitalize on advantages specific to their farms. The study also established that such farmers tend to have low business related debt, use different methods of marketing and are informed on the latest developments and trends in the industry. In addition, the study found that these famers look to maximize their profits by focusing on cost control, quality of products, paying attention to details and achieving high returns while mainly looking at the margins of the enterprise.

The results agree with Nkari (2015) who undertook a study to examine the effect of farmer characteristics on performance of commercial farmers from Kiambu County in Kenya. The study established that the main source of funding used by farmers were income from sales of farm produce and table banking. The study found that the relationship between the characteristics of farmers and the productivity of commercial farmers was significant statistically. The study was however hampered by the limited scope that focused on a few aspects and mostly used self-reported data with no way of collaborating the facts. The study recommended that farmers should improve their abilities by joining group associations, improving their skills and education, conducting agricultural training and increasing their funding in order to enhance their performances. The government should install the required infrastructure and provide the necessary facilities and resources needed to enlighten and support farmers in their initiatives. Since the study focused on fruits and vegetables, future studies can target other agricultural products and use other variables and constructs that were not used in the study.

5.2.4 Moderated Mediation Effect

The fourth objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics (Moderated Mediation). Hayes and Rockwood (2020) model for moderated mediation was adopted. The fourth hypothesis allied to the study objective was stated that **H04:** The moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

The regression of coefficients results show that in step one, the regression model of Change Management on Sugarcane Productivity was significant. In step two, the results indicate that the regression model of change management, situational leadership, farmer characteristics and the interaction term SL*FC was significant. This was shown by the p value for the Moderation mediating term (SL*FC) as being significant for $0.045 < 0.05$ or

0.045 being less than the critical value 0.05. Therefore, the study rejected the null hypotheses that the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

The results agree with Ndahiro, Shukla and Oduor (2015) whose study established a statistically significant relationship between change management and productivity. Okiiya (2013) study on the relationship between change management and productivity established that there was a statistically significant relationship between change management and productivity. The results are consistent with Guo, Wen and Zhu (2015) who assessed the impact of aging agricultural labour population on farmland output: from the perspective of farmer characteristics and results showed that changes in the working-age households have a significant impact on agricultural output. The study also found that elderly farmers who do not intend to abandon farming had higher agricultural output compared to other farmers. This indicates that the adverse effects of changes in the agricultural population age result more from the agricultural output of older farmers who intend to give up farming. This intention adversely affected other elements and reduced investment. Therefore, various forms of training should increase efforts to cultivate modern professional farmers and policies should be simultaneously developed to increase agricultural production levels.

The findings agree with Kassem and Sarhan (2013) on the effect of job characteristics on satisfaction and productivity revealed that productivity was not related to the core job dimensions while satisfaction was. The study posited that the managers of Egyptian agricultural extension system should put job characteristics into consideration for job redesign to enhance satisfaction and productivity of extension agents. The findings by Senen, Masharyono and Edisa (2020) on the effect of job characteristics to employee's productivity indicated that there was a positive influence between job characteristics on employee productivity.

The findings by Wangechi (2014) found that the differences between the mean scores of the perceptions of Millennials (18-33 years), Generation Xers (34-48 years) and Baby Boomers (49-60 years) was not statistically significant at ($p < .05$) level in all the dimensions of employee relations practices. The study concluded that employee productivity did not vary with multi-generational perceptual differences with regards to the various dimensions of human resource development practices at the company. Cekada (2012) posited that each generation thus has unique characteristics, influences, work ethics, core values, and respect and tolerance for others that affect how its members interact, communicate and learn in the workplace. Huggins (2010) considered generation X as valuing flexibility, opportunity to grow and develop, quality products or services, efficient processes and competent people. Generation Yers are characterized as loving fun and flexibility, opportunities to continue learning, corporate responsibility, up-to-date technology and collaboration. The findings differ with Lien, Kumbhakar and Hardaker (2018) who did not find any evidence of off-farm work share affecting farm productivity the predicted off-farm work share was not statistically significant. In other words, we did not find any systematic difference in farm productivity and technical efficiency between part-time and full-time farmers.

The results are in agreement with those of Ruslan, Lian and Fitria (2020) that showed a statistically significant relationship between principal's situational leadership and teacher's productivity. The findings also revealed that there is significant relationship between teacher's professionalism and teacher's productivity. The findings by Kitonga (2017) further established that there is significant positive correlation between Situational leadership practices in general and sustainability in not-for-profit organizations. Specifically, the study findings established positive correlations between determining strategic direction, developing human capital, ethical practices, strategic control and productivity.

5.3 Summary of Research Findings

Chapter five presented discussions of the findings of the study. The discussions and interpretations have been made using statistical knowledge and the existing body of theoretical and empirical literature. Based on the findings, hypothesis one, two and four were not confirmed, while hypothesis three presented mediation. The summary of the results are contained in Table 37.

Table 37: Summary of Hypotheses

Research Objectives	Hypotheses	Hypotheses Test Results (Reject if P-value <0.05)
<p>Objective 1</p> <p>To determine the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya</p>	<p>H01: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya.</p>	Fail to reject
<p>Objective 2</p> <p>To establish the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya.</p>	<p>H02: There is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.</p>	Fail to reject
<p>Objective 3</p> <p>To determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.</p>	<p>H03: There is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya.</p>	Partial Mediation
<p>Objective 4</p> <p>To determine if moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics (Moderated Mediation).</p>	<p>H04: The moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics (Moderated Mediation).</p>	Fail to reject

As indicated in Table 37, hypotheses one was not confirmed that there is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya. In addition, hypotheses two was not confirmed that there is no significant moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. Further, hypotheses three indicated a partial mediation effect. Lastly, hypotheses four was not confirmed that the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics.

5.4 Optimal model from the study outcome

Based on the study findings, a model optimization was conducted. The aim of model optimization was to guide in derivation of the final model where only the significant variables are included for objectivity. Results were arrived at through running regressions analysis. Results of the new conceptual framework are presented in Figure 4.

The optimised study model or revised conceptual model (Figure 4) resembles the study perceived or initial conceptual model (figure 2). This implies good accuracy on of the input variable direct or indirect effect of change management, situational leadership, farmer characteristics on sugarcane productivity as an independent variable. All the variables met the criteria that individually they gave statistically significant response as explained in this chapter and elsewhere.

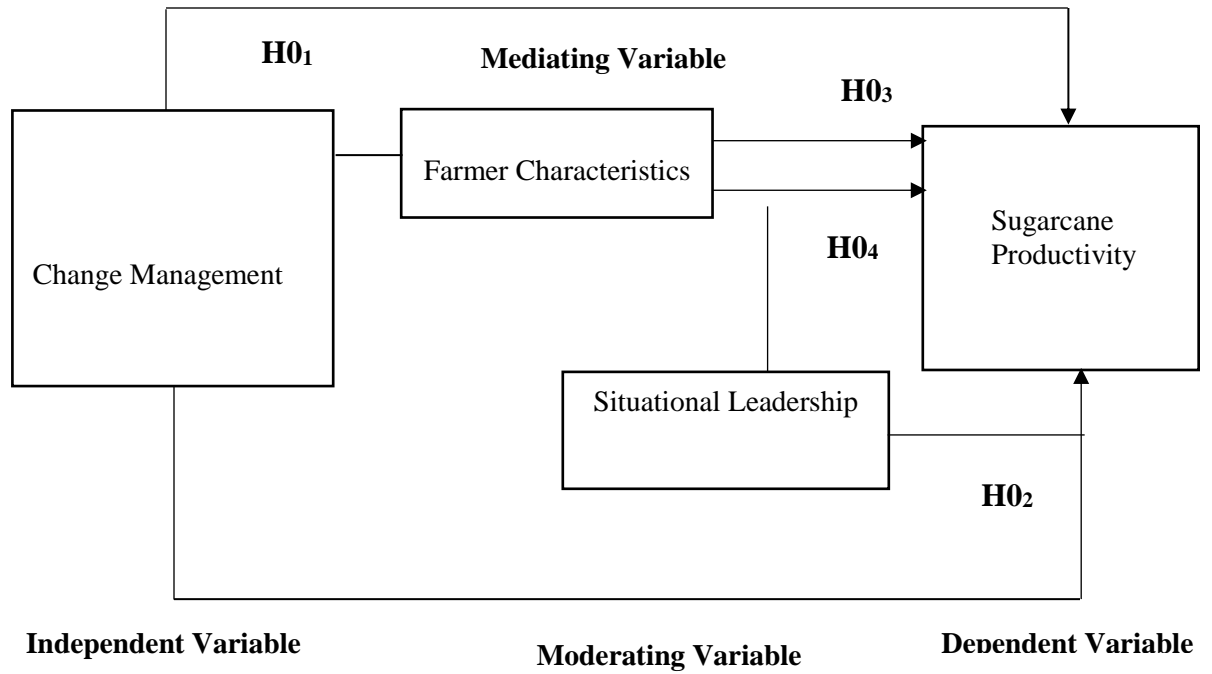


Figure 4: Revised Conceptual Model

CHAPTER SIX

SUMMARY AND CONCLUSIONS

6.1 Introduction

The main objective of the study was to establish the effect of change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. Specifically, the study sought to determine influence of change management and sugarcane productivity in sugar factory cane catchments areas in Kenya; the moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya; the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya; and establishing the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics (Moderated Mediation). The study was motivated by an interest to find out how change management, situational leadership and farmer characteristics affected sugarcane productivity in sugar factory cane catchment areas in Kenya. This chapter presents the summary of the findings, conclusions, recommendations and policy implications, limitations of the study and suggestions for future research.

6.2 Summary of Study

The main objective of the study was to establish the relationship between change management, situational leadership and farmer characteristics on sugarcane productivity in sugar factory cane catchment areas in Kenya. The first objective was tested by hypothesis one as stated in its null form; **H₀₁**: There is no significant effect of change management on sugarcane productivity in sugar factory cane catchments areas in Kenya. The findings show that there exist a positive significant relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya as supported by coefficient of determination R square of 56.3% and $F = 597, p < 0.05$.

The influence of change management was evaluated against the indicators of sugarcane productivity in order to test the influence on dimensions. The results show that change management influences sugarcane productivity in sugar factory cane catchment areas in Kenya.

The second objective of the study was to determine whether Situational leadership moderates the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. This objective was tested by the second hypothesis stated as **H₀₂**: There is no significant moderating effect of Situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. The results of the hypotheses found that situational leadership moderates the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. This was also supported by the R square, which improved from 56.3% to before including the moderating variable to 67% after moderation. Therefore, this led to the rejection of the null hypothesis that there is no significant moderating effect of Situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya. Thus, the study established that there is a significant moderating effect of Situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane areas in Kenya.

The third objective was to determine the mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. This was tested using the third hypothesis stated in the null form that; **H₀₃** There is no significant mediating effect of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The study established that the mediating effect of farmer characteristics was significant with an R square of 65.4% supported by $F=438.134$. There exists a mediating effect of farmer characteristics relationship between change management and sugarcane productivity in sugar factory cane catchments areas in

Kenya as supported by change management ($\beta=0.413, 0.000$), farmer characteristics ($\beta=0.456, 0.000$).

The fourth objective of the study was to determine the moderating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics (Moderated Mediation). The fourth hypothesis stated in the null form was as follows: **H₀₄**: The moderating effect of situational leadership on the relationship between change management and sugarcane productivity is not significantly different from the mediating effect of farmer characteristics (Moderated Mediation). The study found that the moderated mediating effect of situational leadership on the relationship between change management and sugarcane productivity is different from the mediating effect of farmer characteristics was significant.

6.3 Conclusion

Existing literature posits that change management has a positive impact on sugarcane productivity. Scholars have also reported mixed findings on the effect of change management on productivity, whilst some studies have found no significant relationship. Literature therefore concludes that the relationship between change management and productivity is inconclusive owing to the multi-dimensionality of the constructs that define the relationship.

Effective implementation of change programs is normally facilitated by certain critical context-specific factors that need to be understood if the change has to be successful. The success of any well intended change program is a pride to any organization. The findings of this study shade adequate light to draw pertinent conclusions about change management practices adopted by sugarcane factories. It can be concluded that the practices adopted by sugarcane factories were unique to the Company's prevailing circumstances that had led to the quest for change. The findings indicate that the change management practice of managing the human issues is the most important of them all. These findings agree with empirical studies in change management that have been carried

out in other institutions. In change management dimension, it was concluded that strong leadership contributed greatly to the success of the strategic change at sugarcane factories.

This study investigated the relationship between change management and sugarcane productivity in the cane catchments. Indications are that change management enhances sugarcane productivity and this is supported by existing literature. Various regressions were done to find out if the effects were sufficient enough to support or not to support the hypothesis. The results indicated that change management influences sugarcane productivity in sugar factory cane catchments areas in Kenya, Therefore it may be inferred that high profitability may be potentially available in the agribusiness if challenges are promptly resolved for competitive advantage. It is important that outcomes of business evaluation and monitoring particularly in sugarcane productivity be appropriately interpreted for competitive advantage delivery. Change management would require proficient team managers assembled by their leader with knowledge on how to build a competitive organization using proficient approaches in technology, processes, services and goods among other inputs.

The study concludes that there exist a moderating effect of situational leadership on the relationship between change management and sugarcane productivity in sugar factory cane catchment areas in Kenya. Situational leadership was proven to be a very effective leadership style to motivate farmers in different in the sugarcane sector. Situational leadership has a very influential effect on employee's productivity, directly impacting organizational productivity. Situational leadership motivates employees to reach desired organizational goals, promoting good leadership that leads to an increase in farmers' productivity. This is because situational leaders are flexible, change according to situations, know how to direct and coach, and to encourage teams to participate in decision making when their readiness is high. Regular training on best situational leadership capabilities need to be focused on to keep sugar factories competitiveness through better coordination between management in mills and AFFA. Wachiye (2012)

has reported gaps amongst sugar factory chief executives who did little to mitigate against negative impacts from WTO guidelines 2005 applied indirectly through COMESA FTA sugar trade. A new business approach involving: introduction of new sugarcane varieties, mill product diversification and cane pricing based on sugarcane quality among other business strategies were not mainstreamed early enough by the leaders to earn their agribusinesses competitive advantage with the advent of a new sugar trade norm. Business new policy liaisons never worked well between AFA and the millers.

This study has concluded that there exist a mediation effect on the mediating role of farmer characteristics on the relationship between change management and sugarcane productivity in sugar factory cane catchments areas in Kenya. The results showed that probably older farmers were more traditional and less inclined to change, whereas younger farmers tended to be more progressive, willing to try new ideas, and more likely to enrol in extension programs. The loss of mental and physical human energy with advanced age and the departure of children from the household may alter motivation for change. In contrast, the better-educated and younger producers may have fewer years of experience but have more family members available for work on the farm and gave good productivity. Better-educated farmers often times have other sources of income such as salaried jobs, creating time conflicts and isolation from possible support systems.

The study concluded that the Moderated effect of situational leadership on the relationship between change management and sugarcane productivity is significantly different from the mediating effect of farmer characteristics. The same positive and strong correlation was given between leader's relationship behaviour from a side and farmer's productivity in a firm from another side. Thus, situational leaders inside the organizations ought to improve their industrial relationship behaviour in order to increase productivity. This relationship should be one on one as every farmer has unique needs.

CHAPTER SEVEN

RECOMMENDATIONS

7.1 Introduction

The study recommendations are in line with the objectives of the study findings and the conclusions. This chapter re-looks at the implication of the study on the policy, practice and theory. The study therefore has specific implications on policy, practice and theory.

7.1.1 Recommendations on Policy

The study provides significant information for managers of the sugar factories warrant appropriate recommendations. The sugar factories operates in an overly growing competitive environment thus calling for quick strategic changes to cope up. Therefore, this calls for change management in the sugar factories. The expiry of the COMESA safeguards is worry enough to catapult the organization's leadership into strategic change processes that will ensure its future survival. Indeed the recent sugar industry related sugar bill development on ultimate enhanced sugarcane productivity processes that would benefit the sugar sector players from a thoroughly developed viable and probably effective Sugar Act or regulations (for Sugar Bill, 2019). According to WTO guidelines 2005 guidelines best practices for agriculture include cultivation of diverse high quality sugarcane varieties and paying farmers well and promptly on cane quality rather than weight as is currently the practice. The policy change implies enhanced research infrastructure at KALRO for best practice development: variety diversification, and cane quality payments procedure mainstreaming for better farmer motivation. In addition, availing funds by AFA for farm inputs like weeding, fertilizer will be important.

From the study, it became clear that the sugar companies landed in the situation of poor productivity due to lack of responsive situational leadership at mill level. The study has demonstrated that situational leadership with the input of change management has a positive impact on sugarcane productivity. Thus, the study recommends that situational leadership will be core in incorporating the competence of managers to identify the

problems at hand and be able to diagnose for solution finding in the sugar factory sector. The sugar factories leadership needs to focus on running the sugar factories as a business that must survive in a fierce competitive environment. The practices the sugar companies put in place during the strategic change management need to be enhanced to ensure continuity of the results obtained. Strategic change management must partly involve regular subsector tailor made training which currently is limited.

The study recommends that the management should also ensure that their organizations have strong control environment, which will inform their strategies. The strategies should incorporate the farmers need as the generation changes. The needs of the Veterans Character, Baby Boomer character, Xers character, Nexters characteristics may keep changing and thus affecting their operations. The control environment and control activities should on a regular basis be evaluated to provide management with the assurance on the adequacy and effectiveness of mitigation controls that management has put in place over time. Indeed monitoring and evaluation of elements of inputs like attending to extension learning, fertilizers use, weeding efficiency and disease control for ultimate relative sugarcane productivity must be monitored explicitly well by AFA. The current regulator data on the farm operations is not based on generational difference recognition but implicitly making enhanced productivity mitigation applications impossible. Evaluation and monitoring must give explicit performance of Veterans Character, Baby Boomer character, Xers character for strategic engagement on farm.

7.1.2 Recommendations for Practice

The study provides significant information for managers of the sugar companies on the need to implement appropriate change management policies and practice in organizations. The study confirms the earlier research findings that change management has a significant effect on productivity of the sugar companies of organizations. These findings inform the need to ensure adoption of change management as an approach to bring positive change in the sugar factories.

The moderating effect of situational leadership on the relationship between change management and sugarcane productivity provides direction on managers to ensure adoption of the appropriate leadership that drives productivity of the sugar companies. The study found that situational leadership moderates this relationship. This study therefore advocates that the managers in the sugar critically consider situational leadership style in their companies.

The partial mediation effect of farmer characteristics on the relationship between change management and sugarcane productivity contributes to literature on the role of farmers characteristics. These findings are very critical to management to ensure they develop and implement policies that support all category of farmers and their diverse needs. It is helpful for managers to not only identify their own work style but also the style of those they manage at the sugarcane farm. Corrupt and unfair engagements of input diversion and produce theft should be completely eliminated to avoid nurturing of poverty through sub-sector non-performance.

The sugar companies' management can utilize the study findings and take initiative to educate their employees and farmers on the importance of the change and the benefits that come with adopting the current sugar farming practices. The sugar companies can utilize the findings of this study to enrich the management practices at limited and large scale undertaking for competitive edge improvement.

7.1.3 Implication for Theory

This study is anchored on General Systems Theory and assisted heavily by the Kurt Lewin Change Management Theory, which is significant to the study as it holds the relevance of farmers' empowerment through trainings, strategic leadership and operational changes. In the world of competition, sugar factory cane catchments areas like any commercial entity and have to embrace strategic changes in their operations for survival. The model avers that an organization needs to keep adjusting to ever-dynamic environment by adopting the complex adaptive characters for it to survive. The managers are encouraged to change and replace the old practices with new ones for reforms to be

implemented. The model gives a momentous stage involved in implementation of change process hence right policies and initiatives ought to be involved during the transitioning from old to new.

Further, the Situational Leadership Theory informs the study where leaders must be able to adapt to the behaviours of their followers by assessing the situations. Situational Leadership Theory has revealed some flops particularly in mill management responding to WTO guidelines 2005 occasioning productivity declines in the supply of sugarcane to the sub-sector. This caused general socioeconomic risks with eroded business competitiveness. AFA the regulator failed to sensitize the industry players on the potential threat of cane catchment shrinkage and sugar imports. Similarly, AFA did not effectively engage the opportunity offered by generational elements spelled out by generational theory or farmer characteristics in their evaluation and monitoring data. This has denied the sub-sector players an opportunity of relative focus on the generations to deliver on sugarcane productivity. In its context, a corporate situational leader (AFA) failed to inform the corporate users of the data on the existing productivity potential of each miller farmer characters in the sugarcane catchments for enhanced productivity mitigations.

7.2 Suggestions for Future Research

The study focused on all the sugar companies in Kenya. A study on the effect of change management on productivity be conducted in other sectors of the economy settings with similar market environments for comparison of findings such as tea and coffee sectors. Future researchers could also introduce different moderating and mediating variables other than situational leadership and farmer's characteristics and test the effect of such variables on the relationship between change management and productivity. In addition, future research needs to look at other productivity outcomes like market share as the dependent variable. Future researchers may also consider using different constructs of farmers' characteristics as the mediating variable to test if the findings points to a mediation effect as in the current study. Additional research may also be undertaken on

the topic using a different research design like longitudinal type, which should be feasible with a rich database with AFA.

The study was only conducted in the sugar factories yet change management principles apply across all sectors of the economy. There is need to expand the scope of research in this field. Carrying out the research in different sectors which have different structures of change management and policies could yield different results due to their mode of operations. In general, a wider scope of research possibilities exist based on research needs and inclination for practice, policy and theory.

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APPENDICES

Appendix I: Letter of Introduction

Dear Sir/Madam,

RE: CONSENT LETTER FOR DATA COLLECTION

I am a post graduate student at Management University of Africa pursuing a Doctor of Philosophy in Management and Leadership. I am conducting a research on **Change Management, Situational Leadership and Farmer Characteristics on Sugarcane Productivity in Sugar Factory Cane Catchment Areas in Kenya.**

In view of the above, I am humbly requesting you to cooperate in answering the questionnaire/responding to the questions which I will provide in the questionnaires attached here-with. Kindly read the accompanying instructions and respond to the questions as provided for. I also request you to provide me with the necessary documentation and information regarding change management of your Sugar Factory Cane Catchment Areas. This will help me collect the necessary data which will help me in carrying out the analysis, hence, achieve the objectives of the study.

The information that you will provide will remain confidential and will be used exclusively for this research and not for any other purpose whatsoever. Your response and cooperation in this matter will be highly appreciated. Thank you in advance.

Yours Faithfully,

WANJALA AGGREY,

PhD Student.

Appendix II: Questionnaire

Dear Participant,

The aim of this questionnaire is to collect data from Sugar Factory Cane Catchment Areas in Kenya in order to determine the effect of Change Management, Situational Leadership and Farmer Characteristics on Sugarcane Productivity in Sugar Factory Cane Catchment Areas in Kenya. The data collected will be used for academic purposes only. Your participation is highly appreciated as you assist me to fulfill the requirement for the award of the degree of PhD in Management and Leadership. Thank you very much.

PART A: BACKGROUND INFORMATION

Please tick (✓) where applicable:

1. Name of your Sugar Factory Cane Catchment Areas
2. Please indicate your gender.....
 Male Female
3. Please indicate your highest level of education
 High school Diploma Master's degree
 Certificate Bachelor degree PhD
 Others (please specify.....)
4. Please indicate your age
 15-24 Years 25-34 Years 35-44 Years
 45-54 Years 55-64 Years 64+ Years
5. How many years have you been farming sugarcane?
 Below 5 years
 5 to 10 years
 11 to 15 years
 16 to 20 years
 Over 20 years

PART B: CHANGE MANAGEMENT

Kindly indicate the extent to which the following attributes of change management that affect sugarcane productivity. Please (✓) tick appropriately on a scale of 1-5.

(1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 =Agree, 5=Strongly Agree)

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	There is inadequate sugarcane supply for our sugar industry?					
2.	Undeveloped suitable sugarcane growing land may be used to help in the cane supply increase for a sugar factory?					
3.	Our factory supplies enough sugar to our markets in Kenya?					
4.	More money is required for sugar farms extension services for increase in cane yields?					
5.	Frequent farmer mobilization meetings may create successful sugarcane agricultural knowledge transfer for productivity?					
6.	Budgeted and monitored sugarcane farm meetings may be important for enhancement of sugarcane productivity?					
7.	Regular Sugarcane farm visits numbering at least 2 times per crop cycle may improve cane supply to mills?					
8.	Farmers need to keep a record of the extension farm visits for best follow up on improved cane yields?					
9.	Extension staff farm visits are less beneficial in sugarcane cultivation yield increase?					
10.	New sugarcane farming ideas from our researchers may not immensely improve sugarcane yields?					
11.	New sugarcane varieties help in attaining high yields for better cane supply?					
12.	Farmer organizations are a link to better cane yields not achieved now on farms due to					

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	poor advocacy?					
13.	Farmer organizations need to be supported financially by the government for sustainable miller- grower cane farming business?					
14.	Kenyan youths should be allowed early access to sugarcane cultivation land for increased cane yields?					
15.	Funds from sugar levy should be regularly spent on farms to have good cane yields?					
16.	Kenya youths access to Government Youth Fund for development of sugar cane may alleviate sugar sub-sector sugarcane supply challenges?					

SECTION C: SITUATIONAL LEADERSHIP

On a scale of 1 to 5, indicate the extent to which each situational leadership aspects in your extension service that have been favourable for sugarcane productivity. Please (√) tick appropriately on a scale of 1-5: (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 =Agree, 5=Strongly Agree)

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	No clear farming work plans from sugarcane extension leaders may cause sugarcane supply shortages at the sugar factories?					
2.	Poor sugarcane productivity may lead to poor business for farmers and millers due unsatisfactory extension service from extension service teams?					
3.	Deficient sugar farming extension service is a guarantee to business security in the Kenya sugar sub-sector?					
4.	Extension services leadership rewarding farmers enhance sugarcane productivity?					
5.	Poor extension services diminish cane yields of farmers?					
6.	Demotivated sugarcane farmers may be least interested in production of high sugarcane yields?					
7.	Sugarcane extension leaders focused well on best practice delivery could enable good yields of sugarcane to the farmers?					
8.	A consulting extension service leadership may allow a win- win relationship between miller and farmer parties for better liaison in high sugarcane productivity process?					
9.	The same type of consulting leadership may not be the best in high sugarcane yield attainments as the miller, and not farmers, take the					

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	bigger share of the agri-business proceeds demotivating the cane producers?					
10.	A tough or tasking sugarcane extension leadership forcing farmers to deliver on sugarcane productivity may effectively enhance sugarcane productivity on the farms?					
11	The task leadership type in extension services is likely to allow better agribusiness for both farmers and millers?					
12.	Such a tough leadership may however lead to gradual sugarcane farming abandonment through leadership type dislike of better business terms to farmers?					
13.	Well bonded teams of extension service leadership and farmers is what may be needed for greater enhancement of sugar cane productivity on farms?					
14.	Empowerment from team playing extension service may be necessary for farmers to observe best sugarcane farming practice for high sugarcane agribusiness from good yields?					
15.	Empowerment from extension service teams may never improve sugarcane yields as other hidden farming issues of the sugar industry could still cause low crop productivity?					

SECTION D: FARMER CHARACTERISTICS

On a scale of 1 to 5, indicate the extent to which each farmer characteristics aspects in your extension service that have been favourable for sugarcane productivity. Please (√) tick appropriately on a scale of 1-5:(1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Our shared best cane growing experiences for recovery in cane supply to mills has been from our oldest farmers born in 1922-1943?					
2.	Respect to our extension service providers by our oldest influential farmers is likely to earn us special attention from our extension service providers for our improved sugarcane productivity?					
3.	The old sugarcane farmers may be outdated in farming methods that cause decline in cane supply to the mills?					
4.	Younger sugarcane farmers born in 1944-1960 character of encouragement to us all farmers could be a motivation to keep us together as we work on improved cane yields?					
5.	The same younger farmers yearn for better sugarcane farming standards that may be emulated by most of us cane farmers for better farming outcomes including yields for better incomes?					
6.	Farmers born 1944-1960 are limited in other cane farming characters responsible for enhanced sugarcane productivity?					
7.	More recently born sugarcane farmers of period 1961-1980 greatly encourage all farmers to work hard in teams for attainment of better sugar cane yields ?					
8.	The farmers born 1961-1980 have techno-literate character that may help us get additional farming knowledge from internet in addition to that extensionists deliver, for even higher sugarcane yields ?					
9.	The young farmers born in 1961-1980 may					

	have deficient other character that may cause yield decline?					
10.	More recently born farmers of 1981-2000 have civic duty character that may assist in raising cane farmers man-hours for better sugarcane husbandry through creating awareness on COVID 19 health containment measures?					
11.	The youngest farmers show confidence in their sugar farming agribusiness and may inspire other farmers to do well also do well in their agribusiness.					
12	The youngest farmers born 1981-2000 may be limited in other character types leading to decline in sugarcane productivity?					

SECTION E: SUGARCANE PRODUCTIVITY.

On a scale of 1 to 5, indicate the extent to which each Sugarcane Productivity aspects have been favourable in the sugarcane zone. Please (√) tick appropriately on a scale of 1-5 where :1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 =Agree, 5=Strongly Agree

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Supply of sugarcane farming fertilizers like DAP and UREA is essential in achieving high sugarcane yields?					
2.	Extension visits may play a significant role in influencing the use of fertilizers for high sugarcane harvests?					
3.	Given limited availability of arable land, use of modern farming technologies are necessary to deliver on high sugarcane yields?					
4.	Farmer associations are likely to assist in advocacy for availing cheap supply of inputs for high sugarcane yield productivity?					
5.	Use of inorganic fertilizers may improve soil fertility for better sugarcane productivity?					
6.	Access to credit may influence fertilizer use in sugarcane farming for better yields?					
7.	There is probably sufficient soil fertility for farming sugarcane needs in my cane zone?					
8.	The soil in our cane area is might be moderately fertile for sugarcane farming?					
9.	The rainfall in our cane farming area is always consistently reliable for good yields ?					
10.	There is probably readily available farm mechanized assistance for					

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	better cane farming?					
11.	The cost of cane farming inputs is sometimes not manageable for better yields?					
12.	Adequate farm labour availability is necessary in achieving good sugarcane yields?					
13.	Sugarcane farming may provide a steady source of income unlike other farming ventures?					
14.	Sugarcane farming could be self-sustaining due to good yields attained by farmers?					
15.	Intercropping other crops with sugarcane may improve sugarcane yields by providing cash for weed control?					
16.	Cane catchment area roads are likely to be adequately maintained by a miller for rapid farm inputs supply for improved sugarcane yields?					
17.	Sugarcane farming contracts disproportionately allow low payments to farmers causing poor cane husbandry for low sugarcane yields?					
18.	Provision of good quantity and quality seed-cane through credit to farmers may lead to good sugarcane productivity?					

Thank you for your co-operation

Appendix III: Kenya Sugar Sub-sector Sugarcane and Sugar Productivity

Year of farming/Milling	Cultivated in Hectares	Area Harvested in hectares/Year	Cane Area Harvested /Year in %	Mill-cane Supplied to Mills /Year in Tonnes.	Cane Productivity TCH.	Sugar Productivity in Tonnes/year
2017	202,400	73,080	36	4,029,020	55.13	302,812
2016	191,215	67,709	35.	3,747,301	55.34	329,883
2015	220,627	85,761	39.	5,334,944	62.21	459,727
2014	211,342	72,180	35	4,432,861	61.41	592,668
2013	213,920	85,857	40	4,693,861	54.67	600,179
2012	180,000	70,000	39	5,400,000	51.00.	550,000
2011	179,451	69,128	39	5,339,506	58.78	490,000
2010	157,530	68,738	39	5,698,585	64.37	524,000
2009	154,298	65,774	43	5,622,175	65.21	549,898
2008	169,421	54,465.	32	5,165,786	72.94	518,026.
Mean Current Problem Model mill area cultivated	188,020.	71,469	38	4,946,403	60.10.	491,719.
Target Required-mill area cultivable	354,090	134,554.	38	8,700,00	63.00	800,000
Cane Area Deficit to plant/Harvest in Hectares	(166,00).	(-63285)	-	-	-	-

Source: AFA (2021)

Appendix IV: Kenya Sugar Sub-sector Sugar Imports Profile (1997-2017)

Year	Production (metric tonnes)	Consumption (metric tonnes)	Imports (metric tonnes)	Exports (metric tonnes)
1997	401,610	580,000	52,372	25,050
1998	449,132	587,134	186,516	NIL
1999	470,788	609,428	57,701	NIL
2000	401,984	617,270	118,011	2,088
2001	377,438	630,065	249,336	3,600
2002	494,249	652,129	129,966	12,046
2003	448,489	663,780	182,225	11,300
2004	516,803	669,914	164,020	11,580
2005	488,997	695,622	167,235	21,760
2006	475,670	718,396	166,280	13,533
2007	520,404	741,190	230,011	20,842
2008	517,667	751,523	218,607	44,332
2009	548,207	762,027	184,531	1,952
2010	523,652	772,731	258,578	47
2011	490,210	783,660	139,076	16,716
2012	493,937	794,844	238,589	434
2013	600,179	841,957	238,046	104
2014	592,668	860,084	192,121	356
2015	635,674	889,233	247,389	54
2016	639,741	978,746	334,109	98
2017	376,11	1,031,055	989,619	406

Source: AFA Kenya Sugar Industry Year Book of Statistics (2017).

Appendix V: Mill Cane Catchment Area Population of Farmers and Employees

Factory zones.	Factory	Farmers Numbers.	Employee Numbers.	Target population
Coast	KISCOL	500.	48	548
South Nyanza	Sony	21,585	391	21976
	Sukari	14,228	14	14242
	Transmara.	25,000.	87.	25087
Nyando	Chemilil	11,300	153	11453
	Kibos	25,000.	73	25073
	Miwani	1	15.	16
	Muhoroni	15,000.	135	15135
	Soin.	2680.	8	2688
Western	Butali	60,000	160	60,160
	Kabras	86,000	120	86,120
	Mumias	62,356	388.	62,744
	Nzoia	68,632	447.	69,079
Sub-sector Total.	13.	392282	2039.	394,321

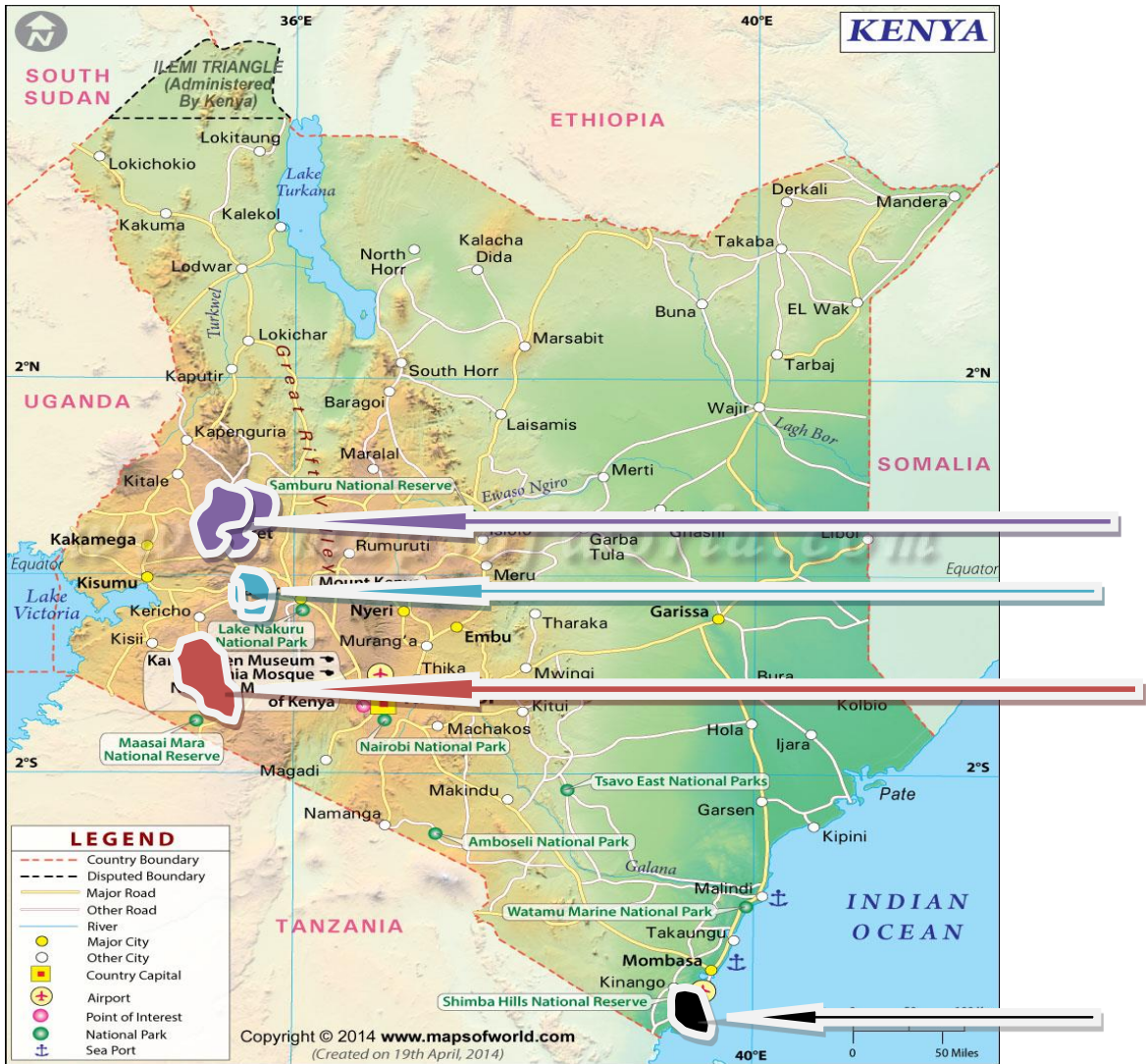
Source: AFA (2021)

Appendix VI: Mill Cane Catchments Population of Farmers and Leaders for Pilot Study

Factory zones.	Factory	Farmer Target Population	Leader Target Population	Pilot Study Farmer Sample	Pilot Study Employee Sample	Pilot Study Total Minimum Sample Size
Coast	KISCOL	500.	48	26	4	30
South Nyanza	Sony	21,585	391	26	4	30
	Sukari	14,228	14	-	-	-
	Transmara.	25,000.	87.	-	-	-
Nyando	Chemilil	11,300	153	26	4	30
	Kibos	25,000.	73	-	-	-
	Miwani	1	15.	-	-	-
	Muhoroni	15,000.	135	-	-	-
	Soin.	2680.	8	-	-	-
Western	Butali	60,000	160	26	4	30
	Kabras	86,000	120	-	-	-
	Mumias	62,356	388.	-	-	-
	Nzoia	68,632	447.	26	4	30
Sub-sector Total.	13.	392282	2039.	130	20	150

Source: AFA (2021)

Appendix VII: Kenya Sugar Sub-sector Thirteen Cane Catchment Study Areas




KEYS:

- Western Zone: Butali, Kabras; Nzoia & Mumias
- Nyando Zone: Chemilil; Muhoroni; Miwani; Kibos & Soin
- S. Nyanza Zone: Sony, Transmara & Sukari
- Coast Zone: KISCOL


Source: Maps of world.com /Kenya & Author

Appendix VIII: NACOSTI Approval



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Appendix IX: F-distribution Table

F - Distribution ($\alpha = 0.05$ in the Right Tail)

df ₂ \ df ₁		Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
1	1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2	1	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385
3	1	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123
4	1	7.7086	9.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	6.9988
5	1	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
6	1	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990
7	1	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
8	1	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881
9	1	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
10	1	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204
11	1	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
12	1	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964
13	1	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
14	1	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
15	1	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
16	1	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377
17	1	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943
18	1	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563
19	1	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
20	1	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928
21	1	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660
22	1	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419
23	1	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201
24	1	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
25	1	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821
26	1	4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655
27	1	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501
28	1	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360
29	1	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229
30	1	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107
40	1	4.0847	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240
60	1	4.0012	3.1504	2.7581	2.5252	2.3683	2.2541	2.1665	2.0970	2.0401
120	1	3.9201	3.0718	2.6802	2.4472	2.2899	2.1750	2.0868	2.0164	1.9588
∞	1	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799

Appendix X: Raw Data

No	Category	Gender	Age	Level of Education	Duration	Change Management	Situational Leadership	Farmer Characteristics	CM*SL	SL*FC	Sugarcane Productivity
1	1	2	4	1	3	1.53	1.68	2.83	2.57	4.75	2.18
2	1	2	6	4	5	1.56	1.31	2.96	2.04	3.88	2.73
3	1	1	2	2	1	4.87	4.48	3.26	21.82	14.6	3.78
4	1	1	3	3	3	1.19	2.15	2.27	2.56	4.88	1.3
5	1	2	2	6	4	2.56	1.52	2.26	3.89	3.44	2.44
6	1	1	4	2	4	4.94	3.47	4.14	17.14	14.37	4.19
7	1	1	6	2	5	4.42	3.74	3.64	16.53	13.61	3.61
8	1	1	4	2	3	3.43	3.52	3.47	12.07	12.21	4.22
9	1	2	5	4	5	4.42	3.43	4.74	15.16	16.26	3.29
10	1	1	2	5	1	3.91	4.34	3.92	16.97	17.01	3.55
11	1	1	5	5	3	4.7	4.62	3.51	21.71	16.22	3.09
12	1	1	5	5	1	4.11	3.71	3.13	15.25	11.61	3.19
13	1	1	1	5	3	4.93	3.6	4.46	17.75	16.06	4.77
14	1	2	6	5	3	3.19	3.73	3.95	11.9	14.73	3.59
15	1	2	5	4	2	2.06	1.26	2.81	2.6	3.54	1.14
16	1	2	6	2	1	2.17	2.94	2.95	6.38	8.67	2.79
17	1	2	4	3	3	1.91	1.84	2.45	3.51	4.51	2.33
18	1	1	3	6	2	4.35	4.77	4.66	20.75	22.23	3.45
19	1	2	3	6	2	4.08	4.67	3.73	19.05	17.42	4.6
20	1	1	1	1	1	4.09	4.39	3.7	17.96	16.24	4.54
21	1	2	1	5	2	1.37	2.53	2.45	3.47	6.2	2.94
22	1	2	6	1	5	4.84	3.19	4.88	15.44	15.57	4.27

23	1	1	5	2	4	1.94	2.11	1.43	4.09	3.02	1.12
24	1	2	3	4	5	1.55	1.06	1.37	1.64	1.45	1.54
25	1	1	1	6	1	3.15	3.82	4.95	12.03	18.91	4.25
26	1	1	4	6	5	4.78	4.2	3.6	20.08	15.12	4.39
27	1	2	4	3	4	2.57	1.51	2.41	3.88	3.64	2.2
28	1	1	3	6	2	3.77	3.16	3.3	11.91	10.43	4.49
29	1	1	6	1	4	2.3	1.31	1.89	3.01	2.48	2.31
30	1	2	4	4	3	3.48	4.43	4.88	15.42	21.62	4.29
31	1	1	4	3	1	4.71	4.36	4.13	20.54	18.01	4.35
32	1	1	6	6	1	2.83	2.95	1.88	8.35	5.55	1.99
33	1	2	4	3	4	1.81	1.42	2.52	2.57	3.58	2.95
34	1	2	5	2	2	4.57	3.6	4.32	16.45	15.55	3.04
35	1	2	6	1	3	2.69	1.77	1.54	4.76	2.73	1
36	1	2	5	3	4	2.18	2.05	1.37	4.47	2.81	1.23
37	1	2	2	4	4	1.26	2.62	2.12	3.3	5.55	2.7
38	1	1	6	4	5	2.74	2.99	2.3	8.19	6.88	2.89
39	1	2	6	5	1	2.93	2.35	1.16	6.89	2.73	1.11
40	1	1	1	3	3	4.77	4.43	4.33	21.13	19.18	3.5
41	1	2	6	2	3	4.81	4.7	3.3	22.61	15.51	4.85
42	1	2	3	3	2	1.17	1.8	1.51	2.11	2.72	1.58
43	1	1	4	4	1	2.84	2.35	2.99	6.67	7.03	2.72
44	1	2	2	3	3	1.56	2.98	1.62	4.65	4.83	2.62
45	1	1	3	4	3	4.09	4.15	3.03	16.97	12.57	4.3
46	1	1	2	6	5	4.83	3.69	4.78	17.82	17.64	3.74
47	1	2	4	2	4	3.94	4.77	3.64	18.79	17.36	3.27
48	1	2	1	4	2	2.23	2.63	1.67	5.86	4.39	2.46

49	1	1	6	4	3	4.49	3.02	4.98	13.56	15.04	3.87
50	1	1	4	6	3	2.41	2.63	1.5	6.34	3.95	1.77
51	1	1	5	2	4	3.44	4.06	3.29	13.97	13.36	4.07
52	1	1	2	1	5	4.16	3.12	4.27	12.98	13.32	4.98
53	1	2	1	5	2	1.68	2.44	2.93	4.1	7.15	1.48
54	1	1	2	2	4	1.32	1.72	2.17	2.27	3.73	2.88
55	1	2	2	3	2	1.83	2.44	2.36	4.47	5.76	2.14
56	1	1	2	4	3	1.49	2.31	1.97	3.44	4.55	2.48
57	1	2	1	3	5	3.56	4.19	3.22	14.92	13.49	3.47
58	1	1	5	5	1	4.12	4.54	3.69	18.7	16.75	3.77
59	1	1	5	5	5	2.21	1.25	1.02	2.76	1.28	2.7
60	1	2	3	6	4	1.3	2.51	1.75	3.26	4.39	2.35
61	1	1	4	3	3	2.26	1.63	2.06	3.68	3.36	1.23
62	1	2	5	4	3	2.53	2.55	2.01	6.45	5.13	2.38
63	1	1	1	4	2	2.36	1.95	1.31	4.6	2.55	1.27
64	1	1	4	6	3	2.42	2.7	2.12	6.53	5.72	2.59
65	1	2	1	3	1	1.39	2.13	2.04	2.96	4.35	1.51
66	1	1	3	6	2	3.18	4.33	4.26	13.77	18.45	3.05
67	1	1	6	4	4	1.14	2.51	1.09	2.86	2.74	1.08
68	1	2	2	5	4	2.3	2.68	1.51	6.16	4.05	2.9
69	1	1	5	6	5	2.01	1.61	1.11	3.24	1.79	2.02
70	1	1	1	3	5	1.31	1.43	1.64	1.87	2.35	1.13
71	1	2	2	4	3	2.94	2.96	1.95	8.7	5.77	2.68
72	1	2	6	6	2	2.78	2.68	2.09	7.45	5.6	2.53
73	1	1	5	1	1	2.02	2.34	1.84	4.73	4.31	2.65
74	1	1	6	3	5	3.65	4.34	3.3	15.84	14.32	3.83

75	1	2	2	2	2	2.06	2.19	2.8	4.51	6.13	2.26
76	1	1	6	3	5	2.76	1.36	2.54	3.75	3.45	2.44
77	1	1	5	1	5	3.69	4.59	3.29	16.94	15.1	3.99
78	1	1	2	1	1	3.97	4.79	3.61	19.02	17.29	4.35
79	2	1	5	3	1	2.84	1.62	1.34	4.6	2.17	1.53
80	2	1	2	6	2	2.63	2.29	2.41	6.02	5.52	2.22
81	2	1	5	2	2	1.77	1.57	1.5	2.78	2.36	1.31
82	2	1	4	3	3	2.03	1.53	1.84	3.11	2.82	1.91
83	2	2	2	1	3	2.38	2.77	1.54	6.59	4.27	1.73
84	2	1	5	6	5	4.37	3.1	3.81	13.55	11.81	4.34
85	2	1	6	6	3	1.94	2.45	2.24	4.75	5.49	2.88
86	2	1	4	4	4	1.25	1.25	1.35	1.56	1.69	2.1
87	2	1	4	4	4	3.82	4.63	3.87	17.69	17.92	4.25
88	2	1	3	5	2	4.12	4.6	3.15	18.95	14.49	4.64
89	2	2	2	5	1	3.89	4.56	4.28	17.74	19.52	4.99
90	2	2	4	5	5	1.68	2.34	2.14	3.93	5.01	2.01
91	2	2	6	2	1	4.16	4.61	4.21	19.18	19.41	3.84
92	2	1	3	5	3	3.39	3.6	4.2	12.2	15.12	4.92
93	2	2	6	5	2	2.0	1.65	1.04	3.3	1.72	2.18
94	2	1	6	1	4	4.47	4.24	3.36	18.95	14.25	3.03
95	2	1	5	4	1	4.2	3.6	3.88	15.12	13.97	4.77
96	2	2	1	1	1	4.52	3.61	3.82	16.32	13.79	3.73
97	2	2	4	1	5	4.66	4.95	3.84	23.07	19.01	4.9
98	2	1	2	2	2	1.03	1.2	1.58	1.24	1.9	2.78
99	2	2	6	1	5	3	4.26	4.88	12.78	20.79	4.31
100	2	1	1	1	2	4.5	4.79	3.52	21.56	16.86	4.57

101	2	1	3	3	3	2.39	1.4	2.49	3.35	3.49	2.94
102	2	1	3	3	3	4.16	4.55	3.25	18.93	14.79	4.27
103	2	2	2	2	1	2.97	2.33	2.96	6.92	6.9	1.57
104	2	1	6	3	5	1.89	2.12	1.39	4.01	2.95	1.4
105	2	2	4	4	5	3.72	4.41	4.64	16.41	20.46	3.63
106	2	2	1	1	2	4.96	3.56	4.9	17.66	17.44	4.04
107	2	2	3	2	1	4.06	3.11	3.93	12.63	12.22	3.55
108	2	1	6	3	2	4.23	4.46	3.41	18.87	15.21	4.11
109	2	2	6	6	3	4.94	4.16	4.18	20.55	17.39	4.56
110	2	2	3	6	3	4.92	4.93	3.78	24.26	18.64	3.53
111	2	2	5	2	4	4.35	4.33	3.04	18.84	13.16	4.92
112	2	1	1	3	4	3.08	4.77	4.61	14.69	21.99	4.2
113	2	2	4	5	1	1.26	2.03	2.51	2.56	5.1	1.6
114	2	2	2	3	4	1.03	2.14	1.51	2.2	3.23	2.32
115	2	2	2	5	5	2.14	1.42	1.41	3.04	2	1.89
116	2	1	5	4	1	2.32	1.91	2.33	4.43	4.45	1.7
117	2	1	5	5	2	3.85	3.71	3.21	14.28	11.91	4.26
118	2	1	4	1	2	1.47	2.67	1.46	3.92	3.9	2.22
119	2	1	5	3	2	4.55	4.11	3.51	18.7	14.43	3.31
120	2	1	5	6	3	4.72	3.72	3.64	17.56	13.54	4.38
121	2	2	1	5	4	4.79	4.78	4.05	22.9	19.36	4.06
122	2	1	5	5	5	2.31	2.78	2.18	6.42	6.06	2.66
123	2	2	6	4	3	1.83	1.78	1.76	3.26	3.13	2.2
124	2	2	4	6	1	3.2	3.34	4.06	10.69	13.56	4.07
125	2	1	4	3	1	2.85	2.55	1.93	7.27	4.92	1.72
126	2	2	3	3	5	2.25	1.54	1.2	3.47	1.85	1.97

127	2	2	3	5	5	4.37	4.45	4.71	19.45	20.96	3.67
128	2	2	3	5	2	4.69	4.78	3.06	22.42	14.63	4.86
129	2	2	3	1	4	1.89	2.06	1.09	3.89	2.25	2.89
130	2	2	1	3	2	2.34	2.1	2.45	4.91	5.15	2.21
131	2	1	2	3	5	3.58	4.97	4.63	17.79	23.01	4.58
132	2	1	6	6	1	3	1.51	2.06	4.53	3.11	2.66
133	2	2	2	4	1	2.45	2.86	2.22	7.01	6.35	1.18
134	2	1	2	6	5	2.87	1.98	1.63	5.68	3.23	2.35
135	2	2	6	5	5	2.84	2.18	2.43	6.19	5.3	2.93
136	2	1	3	4	2	1.95	2.89	1.54	5.64	4.45	1.19
137	2	1	5	1	3	1.29	2.39	2.88	3.08	6.88	2.04
138	2	1	2	1	3	4.48	3.58	4.34	16.04	15.54	3.96
139	2	2	1	3	2	2	1.46	1.16	2.92	1.69	1.58
140	2	1	1	6	4	3.06	3.55	3.07	10.86	10.9	4.79
141	2	1	3	1	4	2.72	2.59	2.46	7.04	6.37	1.76
142	2	1	4	5	3	1.47	1.6	2.36	2.35	3.78	1.27
143	2	2	3	5	5	4.95	4.23	3.49	20.94	14.76	4.57
144	2	2	4	6	3	1.45	1.65	2.15	2.39	3.55	1.25
145	2	1	1	1	3	4.77	4.09	4.74	19.51	19.39	3.45
146	2	1	2	4	4	3.85	4.2	4.21	16.17	17.68	3.46
147	2	2	5	6	3	1.17	1.32	2.39	1.54	3.15	2.32
148	2	1	5	4	4	3.79	5	4.91	18.95	24.55	4.45
149	2	2	3	5	5	4.96	3.89	4.22	19.29	16.42	4.19
150	2	2	6	6	2	3.58	3.04	4.77	10.88	14.5	3.76
151	2	2	3	1	1	2.91	1.14	2.79	3.32	3.18	1.61
152	2	2	2	4	4	2.67	1.31	2.94	3.5	3.85	1.28

153	2	1	6	4	4	4.58	3.93	3.79	18	14.89	4.63
154	2	2	5	6	1	3.32	3.03	3.78	10.06	11.45	4.79
155	2	2	6	1	5	1.44	1.49	1.04	2.15	1.55	2.75
156	2	1	2	1	4	2.48	1.36	1.13	3.37	1.54	1.85
157	2	1	2	3	5	3	2.85	2.86	8.55	8.15	1.03
158	2	2	5	5	3	4.78	3.84	4.97	18.36	19.08	4.58
159	2	2	3	1	1	4.01	3.78	3.55	15.16	13.42	3.4
160	2	2	6	1	2	3.23	4.93	3.64	15.92	17.95	4.52
161	2	2	1	3	1	4.12	3.04	3.98	12.52	12.1	4.49
162	2	1	5	2	4	1.73	2.58	2.02	4.46	5.21	2.73
163	2	1	3	2	5	3.12	3.35	4.04	10.45	13.53	3.21
164	2	2	5	2	4	2.67	2.78	1.22	7.42	3.39	1.66
165	2	2	2	5	5	4.19	4.51	3.39	18.9	15.29	4.03
166	2	2	2	3	5	2.7	1.33	2.84	3.59	3.78	1.23
167	2	2	4	3	3	3.61	4.95	4.82	17.87	23.86	4.91
168	2	1	2	3	5	1	2.1	2.66	2.1	5.59	1.86
169	2	2	4	6	4	1.49	2.19	1.1	3.26	2.41	1.13
170	2	1	4	3	5	1.76	2.54	2.34	4.47	5.94	1.32
171	2	1	4	6	4	4.41	3.35	3.46	14.77	11.59	3.16
172	2	2	4	4	2	3.89	4.5	3.47	17.51	15.62	3.98
173	2	1	4	1	3	4.9	3.74	3.27	18.33	12.23	4.69
174	2	2	4	6	1	3.42	4.33	4.58	14.81	19.83	3.23
175	2	1	4	6	3	2.59	1.61	1.95	4.17	3.14	1.85
176	2	2	4	3	3	2.07	1.51	1.62	3.13	2.45	1.52
177	2	1	4	3	4	2.69	2.63	2.94	7.07	7.73	1.94
178	2	2	4	3	3	1.84	2.98	2.27	5.48	6.76	2.58

179	2	2	4	1	3	1.38	2.62	1.7	3.62	4.45	1.88
180	2	2	4	5	4	1.8	1.44	1.5	2.59	2.16	1.12
181	2	1	4	5	4	1.14	2.83	1.88	3.23	5.32	2.34
182	2	2	4	4	5	2.29	2.55	2.06	5.84	5.25	2.74
183	2	1	4	2	2	4.54	4.47	4.64	20.29	20.74	3.64
184	2	1	4	1	3	2.73	2.08	1.04	5.68	2.16	2.65
185	2	1	4	3	3	3.44	3.96	3.01	13.62	11.92	3.91
186	2	1	4	2	4	1.41	1.09	1.09	1.54	1.19	1.78
187	2	1	4	5	5	1.79	1.24	1.59	2.22	1.97	1.78
188	2	1	4	5	2	4.47	4.12	3.24	18.42	13.35	4.56
189	2	1	4	5	4	1.8	1.89	1.4	3.4	2.65	1.31
190	2	1	4	5	2	2.37	1.69	1.81	4.01	3.06	2.51
191	2	1	4	4	1	2.63	2.01	1.33	5.29	2.67	2.07
192	2	1	4	2	4	4.02	3.84	4.01	15.44	15.4	3.2
193	2	1	4	4	4	3.96	4.57	3.74	18.1	17.09	3.29
194	2	1	4	5	1	1.86	1.55	1.57	2.88	2.43	2.86
195	2	1	4	5	3	1.98	1.2	2.82	2.38	3.38	2.63
196	2	1	4	1	1	2.34	2.14	1.09	5.01	2.33	1.59
197	2	1	4	5	4	3.63	3.99	4.93	14.48	19.67	4.54
198	2	1	4	6	2	4.02	3.29	4.05	13.23	13.32	4.23
199	2	1	4	6	3	4.89	3.79	3.3	18.53	12.51	4.91
200	2	1	4	3	1	1.64	1.04	2.09	1.71	2.17	2.07
201	2	1	4	4	4	3.44	3.88	3.98	13.35	15.44	3.44
202	2	1	4	3	1	3.12	4.59	4.76	14.32	21.85	4.32
203	2	1	4	5	3	3.48	3.55	3.83	12.35	13.6	4.65
204	2	1	4	2	3	2.9	2.98	1.13	8.64	3.37	2.38

205	2	1	4	5	1	3.54	3.81	3.69	13.49	14.06	4.2
206	2	1	4	3	5	1.32	1.88	2.56	2.48	4.81	1.85
207	2	1	4	5	3	1.04	2.61	2.66	2.71	6.94	1.02
208	2	1	4	3	4	3.54	4.27	4.76	15.12	20.33	3.88
209	2	1	4	6	3	1.04	1.74	2.11	1.81	3.67	1.92
210	2	1	4	1	2	3.01	3.77	4.34	11.35	16.36	3.9
211	2	1	4	6	3	1.87	2.75	1.57	5.14	4.32	1.13
212	2	1	4	2	1	4.18	4.63	3.25	19.35	15.05	4.03
213	2	1	4	2	4	1.39	2.26	1.45	3.14	3.28	1.7
214	2	1	2	2	3	2.72	1.32	2.4	3.59	3.17	2.11
215	2	1	6	2	2	2.99	2.63	1.34	7.86	3.52	2.34
216	2	1	4	5	5	4.64	4.57	3.13	21.2	14.3	4.49
217	2	2	6	3	5	3.88	4.85	4.32	18.82	20.95	4.58
218	2	1	2	3	3	1.29	1.45	2.81	1.87	4.07	2.9
219	2	2	2	5	2	1.39	1.34	2.23	1.86	2.99	1.49
220	2	1	1	3	1	2.19	1.31	2.95	2.87	3.86	1.91
221	2	1	2	5	5	2.85	2.72	2.34	7.75	6.36	1.37
222	2	1	2	1	5	2.6	2.03	1.26	5.28	2.56	2.1
223	2	2	5	2	4	2.05	1.66	2.36	3.4	3.92	2.16
224	2	1	4	4	1	1.74	2.98	1.08	5.19	3.22	2.14
225	2	2	4	3	5	1.84	1.99	1.72	3.66	3.42	2.33
226	2	1	6	6	4	3.57	3.34	4.82	11.92	16.1	3.38
227	2	1	1	6	1	2.74	2.12	1.16	5.81	2.46	1.75
228	2	2	4	3	4	3.53	4.6	3.18	16.24	14.63	3.23
229	2	1	6	1	2	3.72	4.06	3.23	15.1	13.11	4.68
230	2	2	5	6	5	2.92	2.83	2.94	8.26	8.32	2.17

231	2	1	5	4	4	4.72	3.49	4.78	16.47	16.68	4.24
232	2	1	2	5	4	3.25	4.76	4.37	15.47	20.8	4.83
233	2	2	2	2	5	1.82	1.19	2.75	2.17	3.27	1.02
234	2	2	1	5	1	4.62	4.08	3.71	18.85	15.14	4.67
235	2	1	6	3	1	1.44	2.58	1.56	3.72	4.02	1.68
236	2	2	6	3	2	4.85	3.19	3.74	15.47	11.93	4.68
237	2	1	3	3	4	3.6	4.4	3.76	15.84	16.54	4.48
238	2	2	1	6	5	4.65	3.96	3.85	18.41	15.25	3.66
239	2	2	4	5	3	3.43	3.35	3.56	11.49	11.93	4.28
240	2	2	1	5	4	3.67	3.08	3.68	11.3	11.33	4.78
241	2	1	2	4	1	3.22	4.92	4.19	15.84	20.61	4.91
242	2	2	2	4	4	1.32	1.47	1.92	1.94	2.82	2.88
243	2	2	1	5	2	3.48	4.99	3.29	17.37	16.42	4.09
244	2	2	4	4	2	2.09	2.46	2.36	5.14	5.81	1.38
245	2	1	3	1	1	2.81	2.98	1.84	8.37	5.48	1.03
246	2	2	6	1	4	2.88	1.85	2.93	5.33	5.42	2.31
247	2	1	5	3	4	2.46	2.82	1.55	6.94	4.37	2.32
248	2	1	5	3	2	2.05	1.29	1.02	2.64	1.32	2.51
249	2	2	5	2	2	2.38	2.5	2.86	5.95	7.15	2.36
250	2	2	4	2	4	1.21	1.1	1.08	1.33	1.19	2.11
251	2	2	5	4	5	4.68	4.74	3.35	22.18	15.88	3.92
252	2	1	4	4	3	1.49	2.87	2	4.28	5.74	1.18
253	2	1	5	5	2	4.76	4.28	4.55	20.37	19.47	4.54
254	2	1	3	6	2	2.89	1.66	1.72	4.8	2.86	1.95
255	2	1	4	4	5	1.22	1.46	2.29	1.78	3.34	1.83
256	2	1	1	3	4	3.74	3.67	3.08	13.73	11.3	3.35

257	2	1	4	4	4	4.8	4.43	4.53	21.26	20.07	4.77
258	2	1	6	3	1	3.62	3.12	3.76	11.29	11.73	4.64
259	2	1	2	3	1	1.04	1.08	2.96	1.12	3.2	2
260	2	1	2	2	3	2.99	1.95	2.59	5.83	5.05	2.53
261	2	1	1	5	1	3	4.67	4.78	14.01	22.32	3.01
262	2	1	4	4	1	4.68	3.6	3.18	16.85	11.45	4.41
263	2	1	2	4	5	4.41	3.87	3.87	17.07	14.98	3.77
264	2	1	6	4	1	1.34	1.25	1.39	1.68	1.74	2.81
265	2	1	5	6	4	4.95	3.15	4.88	15.59	15.37	4.92
266	2	1	2	5	1	2.89	2.59	2.13	7.49	5.52	1.47
267	2	1	1	1	4	3.15	4.86	4.29	15.31	20.85	4.91
268	2	1	6	2	1	4.31	4.02	3.35	17.33	13.47	3.08
269	2	1	6	4	3	2.01	1.59	2.48	3.2	3.94	1.81
270	2	1	4	6	2	2.02	2.71	1.4	5.47	3.79	2.83
271	2	1	1	1	5	2.84	2.66	1.16	7.55	3.09	1.4
272	2	1	6	6	5	3.14	4.39	4.21	13.78	18.48	3.48
273	2	1	4	3	3	4.96	3.59	4.99	17.81	17.91	3.55
274	2	1	1	1	4	2.25	2.77	1.58	6.23	4.38	1.23
275	2	1	6	4	4	4.47	4.25	3.66	19	15.56	3.68
276	2	1	1	5	4	3.51	4.4	4.65	15.44	20.46	3.58
277	2	1	1	1	3	2.49	2.77	1.46	6.9	4.04	2.75
278	2	1	1	6	2	4.05	3.69	4.43	14.94	16.35	2.99
279	2	1	4	2	4	1.79	2.88	2.73	5.16	7.86	2.67
280	2	1	1	4	5	1.82	2.9	2.1	5.28	6.09	1.19
281	2	1	2	6	3	3.38	3.86	4.28	13.05	16.52	3.29
282	2	1	5	6	5	1.72	1.14	2.38	1.96	2.71	2.63

283	2	1	3	4	2	3.23	4.16	3.47	13.44	14.44	3.2
284	2	2	4	2	4	2.21	2.04	1.59	4.51	3.24	2.39
285	2	1	6	4	3	3.56	3.95	4.91	14.06	19.39	4.16
286	2	2	5	3	5	2.51	1.83	1.19	4.59	2.18	1.71
287	2	2	2	5	5	1.72	2.74	2.72	4.71	7.45	2.91
288	2	1	4	1	3	4.35	4.56	4.44	19.84	20.25	4.85
289	2	1	4	5	3	4.8	3.84	3.43	18.43	13.17	3.35
290	2	2	2	2	2	2.04	1.18	2.64	2.41	3.12	1.31
291	2	2	2	3	1	3.79	3.71	3.98	14.06	14.77	4.99
292	2	1	3	6	2	4.22	3.72	4.09	15.7	15.21	3.06
293	2	1	3	1	4	4.4	3.88	3.98	17.07	15.44	3.23
294	2	2	5	2	2	1.36	2.18	1.38	2.96	3.01	2.26
295	2	1	5	6	3	2.72	2.98	2.81	8.11	8.37	2.46
296	2	1	4	3	1	2.74	2.25	1.68	6.17	3.78	2.5
297	2	2	5	4	1	1.93	2.21	1.94	4.27	4.29	2.08
298	2	2	5	2	3	4.61	4.7	3.82	21.67	17.95	3.25
299	2	2	2	3	5	4.83	3.65	3.65	17.63	13.32	3.89
300	2	1	5	4	3	2.71	2.15	1.04	5.83	2.24	1.1
301	2	2	4	1	2	2.75	1.12	1.19	3.08	1.33	1.83
302	2	2	3	3	2	1.35	2.31	2.9	3.12	6.7	2.71
303	2	1	1	3	4	3.23	4.73	4.46	15.28	21.1	4.8
304	2	2	4	5	1	3.65	4.16	4.89	15.18	20.34	4.52
305	2	1	2	6	4	3.85	4.54	4.67	17.48	21.2	3.57
306	2	2	5	5	2	4.97	3.7	3.95	18.39	14.62	4.7
307	2	1	2	2	2	2.88	2.32	1.37	6.68	3.18	1.14
308	2	1	6	4	2	1.43	2.53	1.7	3.62	4.3	2.35

309	2	2	4	5	3	2.97	1.58	1.93	4.69	3.05	1.3
310	2	1	2	1	1	4.19	3.08	3.24	12.91	9.98	4.81
311	2	2	6	5	1	4.11	3.25	4.35	13.36	14.14	4.41
312	2	2	6	2	5	1.86	2.3	2.58	4.28	5.93	2.82
313	2	2	3	6	1	4.75	3.52	4.75	16.72	16.72	4.32
314	2	2	2	3	5	2.08	1.79	2.61	3.72	4.67	2.58
315	2	1	4	2	5	1.87	2.63	2.49	4.92	6.55	2.04
316	2	1	1	4	5	4.41	4.13	4.47	18.21	18.46	3.18
317	2	1	6	2	4	4.51	3.1	4.38	13.98	13.58	4.15
318	2	1	2	3	3	1.23	1.19	2.03	1.46	2.42	2.69
319	2	1	4	2	1	3.83	3.81	3.68	14.59	14.02	4.12
320	2	1	6	1	3	3.04	4.01	3.21	12.19	12.87	4.02
321	2	1	6	2	1	4.49	4.32	4.37	19.4	18.88	3.53
322	2	1	1	4	4	3.2	4.26	3.25	13.63	13.85	4.31
323	2	1	1	5	2	3.43	3.42	4.53	11.73	15.49	3.3
324	2	1	2	6	3	1.46	1.68	2.33	2.45	3.91	2.11
325	2	1	1	6	3	3.66	3.01	3.52	11.02	10.6	4.42
326	2	1	4	3	1	4.71	4.81	4.37	22.66	21.02	3.82
327	2	1	1	1	4	4.11	3.62	3.03	14.88	10.97	5
328	2	1	3	3	2	4.44	3.15	3.64	13.99	11.47	3
329	2	1	5	6	4	3.86	4.7	3.51	18.14	16.5	4.38
330	2	1	1	1	4	3.19	4.77	4.55	15.22	21.7	4.3
331	2	1	6	6	4	2.71	2.57	2.92	6.96	7.5	2.96
332	2	1	6	6	2	2.53	2.6	2.61	6.58	6.79	1.91
333	2	1	3	1	5	1.67	2.62	2.58	4.38	6.76	1.68
334	2	1	4	3	4	2.75	2.18	1.11	6	2.42	2.48

335	2	1	2	1	1	1.26	1.02	2.82	1.29	2.88	2.64
336	2	1	2	2	5	3.04	3.78	4.16	11.49	15.72	4.08
337	2	1	5	3	3	3.09	3.32	3.67	10.26	12.18	4.93
338	2	1	3	2	4	1.33	2.68	1.05	3.56	2.81	1.38
339	2	1	5	3	2	3.88	4.71	3.54	18.27	16.67	4.91
340	2	1	6	4	2	3.7	3.91	3.68	14.47	14.39	3.66
341	2	1	2	5	3	4.95	4.95	3.14	24.5	15.54	3.06
342	2	1	1	4	1	4.48	4.46	4.32	19.98	19.27	4.04
343	2	1	6	3	3	2.6	2.05	2.98	5.33	6.11	1.25
344	2	1	4	4	1	4.76	4.55	4.46	21.66	20.29	3.91
345	2	1	1	6	5	2.78	1.51	2.69	4.2	4.06	2.56
346	2	1	5	6	2	2.83	2.12	2.95	6	6.25	2.22
347	2	2	4	3	3	1.48	1.19	1.95	1.76	2.32	2.21
348	2	2	3	2	3	4.9	4.11	3.12	20.14	12.82	3.61
349	2	2	4	4	2	3.64	4.44	3.93	16.16	17.45	4.41
350	2	1	3	5	3	3.52	3.69	4.17	12.99	15.39	4.43
351	2	1	3	3	1	3.89	3.33	3.36	12.95	11.19	3.18
352	2	1	5	4	5	1.92	2.6	1.8	4.99	4.68	2.44
353	2	1	4	3	3	1.32	2.05	1.26	2.71	2.58	2.54
354	2	1	3	1	2	4.83	3.68	4.01	17.77	14.76	4.11
355	2	1	5	2	3	1.44	2.37	2.25	3.41	5.33	2.69
356	2	1	6	2	1	2.97	2.65	2.49	7.87	6.6	1.84
357	2	1	6	1	1	1.79	2.93	2.91	5.24	8.53	1.98
358	2	1	6	6	3	3.28	4.94	4.1	16.2	20.25	4.6
359	2	1	3	6	4	3.75	3.53	3.46	13.24	12.21	4.14
360	2	1	2	4	1	1.12	1.71	1.14	1.92	1.95	2.15

361	2	1	1	2	2	4.36	4.67	3.38	20.36	15.78	3.7
362	2	1	1	2	3	4.18	3.3	4.31	13.79	14.22	3.52
363	2	1	5	2	2	2.08	2.55	2.03	5.3	5.18	1.9
364	2	1	2	2	1	1.34	2.98	1.82	3.99	5.42	1.81
365	2	1	5	3	2	4.75	3.1	3.8	14.73	11.78	3.35
366	2	1	5	1	4	4.09	3.25	4.17	13.29	13.55	4.69
367	2	1	6	6	1	4.19	4.08	3.06	17.1	12.48	3.31
368	2	1	4	5	5	4.02	4.2	4.66	16.88	19.57	3.47
369	2	1	4	5	3	2.41	1.92	1.29	4.63	2.48	2.37
370	2	1	4	3	3	1.8	2.44	2.44	4.39	5.95	1.32
371	2	1	6	1	5	2.09	1.52	1.6	3.18	2.43	2.49
372	2	1	3	1	4	2.96	1.13	1.08	3.34	1.22	2.36
373	2	1	5	5	4	1.86	2.89	1.68	5.38	4.86	1.92
374	2	1	6	3	3	3.69	4.92	3.24	18.15	15.94	4.39
375	2	1	2	6	4	2.25	2.51	2.08	5.65	5.22	2.28
376	2	1	4	2	4	4.63	3.24	4.1	15	13.28	4.73
377	2	1	6	4	5	4.79	3.33	3.19	15.95	10.62	3.69
378	2	1	1	2	5	3.15	3.94	3.93	12.41	15.48	3.57
379	2	1	6	2	2	2.75	2.8	2.21	7.7	6.19	2.7
380	2	1	2	3	4	1.78	2.78	1.91	4.95	5.31	2.16
381	2	2	2	3	5	4.62	4.37	3.2	20.19	13.98	3.66
382	2	1	5	2	3	1.11	1.28	1.52	1.42	1.95	2.16
383	2	2	1	4	1	3.4	4.69	3.81	15.95	17.87	3.23
384	2	2	2	1	1	2.33	1.95	2.9	4.54	5.66	1.38
385	2	1	2	3	4	2.85	2.21	1.14	6.3	2.52	1.16
386	2	2	4	2	1	2.93	2.8	1.96	8.2	5.49	1.62

387	2	2	6	2	3	4.89	4.92	3.59	24.06	17.66	4.65
388	2	2	2	3	1	3.28	4.29	3.22	14.07	13.81	4.36
389	2	1	1	2	3	4.22	3.89	3.65	16.42	14.2	3.77
390	2	2	2	1	4	4.23	3.19	3.78	13.49	12.06	3.94
391	2	2	3	5	2	2.84	2.09	1.42	5.94	2.97	1.66
392	2	2	1	3	4	1.98	1.84	1.21	3.64	2.23	1.48
393	2	1	2	4	2	2.79	2.68	2.23	7.48	5.98	1.88
394	2	1	4	4	4	2.85	2.41	1.64	6.87	3.95	1.64
395	2	1	4	2	5	3.07	4.11	4.86	12.62	19.97	3.96
396	2	1	6	6	2	2.99	1.04	2.94	3.11	3.06	1.8
397	2	2	6	3	3	3.71	3.82	3.52	14.17	13.45	3.14
398	2	2	4	4	4	2.17	1.94	1.93	4.21	3.74	1.01
399	2	1	5	3	4	4.47	3.5	4.49	15.65	15.72	3.92
400	2	2	6	3	3	3.44	4.03	5	13.86	20.15	3.77
401	2	2	1	5	3	1.76	2.81	2.82	4.95	7.92	1.92
402	2	1	1	2	3	3.58	4.19	3.48	15	14.58	4.72
403	2	1	3	3	2	4.13	3.63	3.71	14.99	13.47	3.04
404	2	2	1	6	5	4.98	3.57	3.04	17.78	10.85	4.67
405	2	2	6	1	1	4.09	4.22	4.93	17.26	20.8	3.84
406	2	1	2	5	4	3.5	3.28	3.96	11.48	12.99	4.2
407	2	2	5	5	1	2.38	2.87	1.39	6.83	3.99	2.97
408	2	2	4	5	2	4.63	3.29	3.99	15.23	13.13	3.55
409	2	2	2	6	3	2.79	2.21	1.02	6.17	2.25	1.88
410	2	2	2	3	3	2.13	1.5	1.39	3.2	2.09	1.33
411	2	1	2	4	2	2.01	1.64	2.62	3.3	4.3	2.16
412	2	2	4	5	2	1.37	1.84	1.27	2.52	2.34	2.48

413	2	1	3	1	2	1.26	2.97	2.56	3.74	7.6	2.46
414	2	2	4	1	4	1.22	1.77	2.75	2.16	4.87	2.73
415	2	2	6	1	5	3.65	3.35	3.11	12.23	10.42	4.73
416	2	2	4	2	5	4.91	3.28	4.76	16.1	15.61	4.12
417	2	2	1	5	2	1.58	1.31	1.22	2.07	1.6	2.34
418	2	1	3	2	1	2.89	2.29	1.75	6.62	4.01	2.6
419	2	1	6	1	3	1.86	1.68	2.89	3.12	4.86	1.41
420	2	2	1	1	1	2.02	1.7	1.24	3.43	2.11	1.49
421	2	2	1	2	3	2.48	2.27	2.81	5.63	6.38	1.23
422	2	2	3	4	2	4.28	4.55	3.67	19.47	16.7	3.92
423	2	2	3	3	4	4.43	4.58	4.46	20.29	20.43	4.56
424	2	2	3	6	1	4.74	4.97	4.47	23.56	22.22	3.38
425	2	1	2	2	5	2.48	1.19	2.3	2.95	2.74	2.4
426	2	2	1	1	3	4.56	4.25	4.7	19.38	19.98	3.47
427	2	2	4	5	2	1.97	1.4	2.18	2.76	3.05	2.85
428	2	2	3	2	2	2.37	2.81	2.86	6.66	8.04	1.76
429	2	1	5	2	3	3.51	4.22	4.69	14.81	19.79	4.17
430	2	1	3	6	4	5	4.04	4.98	20.2	20.12	4.75
431	2	1	5	4	5	2.68	1.7	2.78	4.56	4.73	1.42
432	2	1	2	1	3	3.26	4.71	4.63	15.35	21.81	3.79
433	2	1	4	1	5	4.1	4.29	4.8	17.59	20.59	3.23
434	2	1	4	6	3	1.43	2.19	1.45	3.13	3.18	2.64
435	2	2	2	5	2	1.31	1.35	1.37	1.77	1.85	1.99
436	2	1	2	4	1	4.04	4.75	3.1	19.19	14.73	3.68
437	2	1	1	3	1	2.91	1.47	1.19	4.28	1.75	1.93
438	2	2	6	1	1	3.97	3.19	3.11	12.66	9.92	3.72

439	2	1	3	4	2	1.37	2.12	1.43	2.9	3.03	1.14
440	2	2	1	2	4	3.67	4.63	3.52	16.99	16.3	3.02
441	2	1	2	6	4	2.52	1.94	2.4	4.89	4.66	2.68
442	2	1	4	6	1	1.64	2.35	2.01	3.85	4.72	1.35
443	2	1	6	2	2	1.63	1.15	1.59	1.87	1.83	1.28
444	2	1	2	4	5	3.8	4.54	3.45	17.25	15.66	4.26
445	2	2	2	4	4	1.38	2	1.97	2.76	3.94	1.13
446	2	1	4	4	1	3.08	3.81	3.09	11.73	11.77	4.55
447	2	1	4	3	4	4.62	3.14	3.48	14.51	10.93	4.1
448	2	1	4	5	5	1.09	2.03	2.23	2.21	4.53	1.33
449	2	2	6	6	4	4.33	3.52	4.84	15.24	17.04	4.61
450	2	1	5	1	1	3.95	3.19	3.99	12.6	12.73	4.65
451	2	2	5	4	3	4.18	4.42	4.29	18.48	18.96	4.88
452	2	2	1	3	3	3.78	3.32	4.28	12.55	14.21	3.47
453	2	1	6	6	4	1.03	1.61	1.1	1.66	1.77	1.75
454	2	2	1	6	2	1.12	1.82	1.24	2.04	2.26	1.2
455	2	2	4	4	3	4.95	4.52	4.1	22.37	18.53	4.37
456	2	2	6	1	4	2.71	1	1.88	2.71	1.88	1.6
457	2	2	3	5	5	2.82	2.32	1.55	6.54	3.6	2.35
458	2	2	6	3	5	3.92	4.59	3.8	17.99	17.44	3.88
459	2	1	5	4	2	2.51	1.57	1.3	3.94	2.04	1.28
460	2	1	1	3	4	2.63	1.86	2.34	4.89	4.35	2.02
461	2	1	6	4	5	1.63	1.91	1.18	3.11	2.25	2.84
462	2	2	2	3	1	1.51	1.27	1.23	1.92	1.56	1.1
463	2	1	5	2	2	4.68	3.2	3.36	14.98	10.75	4.36
464	2	2	5	5	5	1.91	1.14	1.62	2.18	1.85	2.54

465	2	2	6	4	3	3.66	4.39	4.71	16.07	20.68	3.29
466	2	2	6	5	5	1.72	1.22	2.72	2.1	3.32	2.66

Appendix XI: Plagiarism Index



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