STAKEHOLDERS' PRESSURE AND GREEN INNOVATION PRACTICES IN CHEMICAL MANUFACTURING FIRMS IN KENYA.

MOSES NDUNG'U KAMAU

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN SUPPLY CHAIN MANAGEMENT, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

2019

DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any other university.

Signature …… Date ……

MOSES NDUNGU KAMAU

D67/10647/2018

This research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

To my lovely daughters Rita Wambui and Noreen Muthoni.

ACKNOWLEDGEMENTS

To write a research project is an arduous journey only made bearable and possible by support from various quarters – and I want to take this opportunity to thank those who assisted in the accomplishment of this study.

I am very thankful for the invaluable support provided by my Project Supervisor, Dr. Ombati. He patiently guided my research.

I'm also thankful to the organizations and their staff who spared their time to read and fill the questionnaire. Their responses are at the core of the research findings.

Special thanks to my employer, the International Committee of the Red Cross (ICRC), for financing my MSc degree in Supply Chain Management.

Warmest gratitude to my family and friends, especially my dear wife Lucy Muthoni and our lovely daughters Rita and Noreen who always encourage me to go the extra mile.

ABBREVIATIONS AND ACRONYMS

GDP	Gross Domestic Product
GOK	Government of Kenya
IEA	International Energy Agency
KAM	Kenya Association of Manufacturers
KNBS	Kenya National Bureau of Statistics
NEMA	National Environment Management Authority
NRBV	Natural Resource Based View
OECD	Organization for Economic Co-operation and Development
R & D	Research and Development
RBV	Resource Based View
SD	Standard Deviation
UN	United Nations
UNEP	United Nations Environment Programme

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ABSTRACT

The study was inspired by a scarcity of research in the area of green innovation in the less developed countries despite it being a topical area in emerging and developed economies. The study was steered by two objectives: to determine the extent to which green innovation practices have been adopted by the chemical manufacturing firms in Kenya and to establish the effect of stakeholders' pressure on green innovation among chemical manufacturing firms in Kenya. The study employed a cross sectional descriptive design. The total population was 102 chemical manufacturing firms and since the population was large, sampling was done. 82 chemical manufacturing companies in Kenya spread over 4 sub sectors formed the sample of the study. The top management in supply chain, operations, logistics and Innovations departments were the preferred respondents as they are deemed to be the most knowledgeable about the research area. The study used primary data which was collected by way of questionnaires and then analyzed using SPSS. Mean and standard deviation were utilized to evaluate the extent of adoption of green innovation by chemical manufacturing companies in Kenya whereas regression analysis was utilized to analyze the effect of stakeholders' pressure on green innovation adoption. The findings point out that most of the chemical manufacturing firms in Kenya have adopted green process innovations, green product innovation and green organizational innovations to a large extent. Customer pressure and competitor pressure positively and significantly influenced the adoption of green innovation practices while government pressure, supplier pressure and employee pressure had no influence on the adoption of green innovation practices. The study was limited contextually as it only focused on chemical manufacturing firms and bureaucracy could not allow the collection of all the questionnaires and thus 66 out of the 82 were collected. The respondents were however guaranteed on the privacy of the information they gave. The study recommends that firms should engage stakeholders as they determine the adoption of key practices in their institutions. From the findings of the study, the researcher suggests that further study should focus on why government pressure, employee pressure and supplier pressure do not influence green innovations. The study can be done in other sectors away from the chemical manufacturing firms.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Environmental pollution is a major threat to the world's sustainable development efforts. The United Nations Sustainable Development Goals (SDGs) focus on reestablishing the distorted environmental equilibrium through initiatives such as: clean energy, clean technologies, clean industrial processes, sustainable cities and communities, responsible consumption and conservation of water and land (UN, 2016).

The manufacturing sector is the biggest consumer of resources globally (OECD, 2009) and accounts for 38% of world's carbon dioxide (CO2) emissions (IEA, 2008). Increasing industrial activity create environmental challenges relating to resource scarcity, climate change, and energy security (Singh & Chadran, 2017). The complexity of these environmental problems has triggered restructuring of firm practices and environmental policies and attracted a lot of interest from researchers of different fields and disciplines (Singh & Chadran, 2017). Green innovation has come to the fore as a potential cure of complex environmental threats (Triguero, Moreno- Mondéjar, & Davia, 2013). El-Kassar and Sign (2017) state that various models should be adopted and implemented in response to the environmental challenges including green technologies, green innovation and green supply chain management. According to Chang (2011), green innovation is a strategic tool for sustainable development.

The major external players that exert pressure on a firm to act or not to act in a particular way include suppliers, customers, competitors and regulatory authorities (Kuo & Chen, 2016). Institutional pressure explains the pressure, restrictions and expectations of these bodies towards organizations (Fikru, 2014). The natural resource-based view (NRBV) theory posit that the sustainable competitiveness strategy of the coming years will be based on integration of environmental factors to firm's capabilities and economic activities (Hart, 1995). El-kasser and Singh (2017) postulate that human capital is among the strategic resources and considering the challenges facing organizations, firms increasingly need to nurture their 'green' capabilities. Higher firm performance and competitiveness is positively influenced by staff commitment to the environment (Ar, 2012). Stakeholder's perspective is considered a key determinant of green innovation (El-kasser & Singh, 2017). According to Weng, Chen and Chen (2015),

various stakeholder's concerns (internal and external) such as customers, investor preferences, government regulations and suppliers influence a firm's green practices.

1.1.1 Stakeholders Pressure

Freeman (1984) defines **S**takeholder as "any group or individual who can affect or is affected by the achievement of the organization's objectives". It represents a "group that the firm needs in order to exist, specifically customers, suppliers, employees, financiers, and communities" (Dunham, Liedtka & Freeman, 2006, p. 25). Effective management of the environment calls for the singling out of important stakeholders (Buysse & Verbeke, 2003) and effectively addressing the concerns and demands of each (Freeman, 2004).

The number of stakeholder groups pressuring for greater environmental responsibility from organizations has risen in recent years (Gondivan, 2017). Stakeholders pressure is among the main drivers of a firm's green practices (Weng, et al., 2015). Different stakeholder pressures motivate implementation of different green practices resulting to different extents of environmental performance improvement (Weng, et al., 2015). Companies experience competing demands from the complex network of stakeholders within their operating environment (Hoffman, 2001). According to Mitchel, Agle and Wood (1997), the salience of different stakeholders is not equal hence the focal firm will most likely prioritize a stakeholder's claim based on the stakeholder's power, the claim legitimacy and the claim urgency.

1.1.2 Green Innovation Practices

Wagner (2008) views Green innovation as a sub-set of all innovations available to an economy. Innovation can be described as that process involved in implementing new products, processes or methods including modification of existing ones to achieve greater effectiveness and efficiency. Hence, innovation helps foster firm success through products and processes that perform better than alternatives (Wagner, 2008). Raza and Murad (2014) acknowledge innovation as a crucial activity to establishing 'core competitive advantage' for fostering a company's long run-development. The need to gain a competitive edge has pressured companies to pursue innovation as a critical differentiation strategy (Wagner, 2008). For firms to attain sustainable growth, they must actively pursue green innovations including green product and manufacturing processes designs (Tseng, Wang, Chiu, Geng & Li, 2013).

Green innovation is "the creation or implementation of new, or significantly improved products (goods and services), processes, marketing methods, organizational structures and institutional arrangements which - with or without intent – lead to environmental improvements compared to relevant alternatives" (OECD, 2009, p. 2). Researchers have used sustainable, ecological (eco-) innovation and environmental innovation as synonyms of green innovation (Singh & Chadran, 2017). Green Innovation can infuse eco-efficiency, which minimizes the environmental impact of industrial activities (Singh & Chadran, 2017). According to Horbach, 2008, green innovation is differentiated from other innovations by the characteristic of providing solutions that have less adverse effect to the environment than alternatives whether the effect is planned (the primary goal) or not (happening by chance). Porter and van der Linde (1995) proffer that the costs incurred in eco investments will be offset through increased product value arising from green innovations. An enterprise corporate image may as well be enhanced. Through green innovation, industry will obtain increased efficiency, cost savings, better product quality and increased productivity (Chiou, Chan, Lettice & Chung, 2011).

In this study, green innovation is referred to as any undertaking that directly or indirectly minimizes environmental harm by curbing pollution, conserving energy, waste recycling and environmental management. The Oslo manual (OECD/Eurostat, 2005) points out several types of green innovations, *viz.* Green Process Innovation, Green Product Innovation, Green Organizational Innovation and Green Marketing Innovation. This paper will focus on the first three main types of green innovations.

1.1.3 Chemical Manufacturing Firms in Kenya

According to the United Nations Environment Programme, the global chemical industry's worth is foreseen to increase twice by year 2030 (UNEP, 2019). This growth is likely to increase environmental burden hence becoming a net negative for humanity if the chemicals challenge is not addressed with greater effort. According to UNEP (2019), sustainable supply chain management, green chemistry innovations, and embracing common chemical management approaches can minimize the threat to human health, biodiversity and economies. According to OECD (2001), the chemicals industry is quite diverse and can be categorized into: (a) basic (or commodity chemicals); (b) specialty chemicals, such as, coatings, electronic chemicals, adhesives and sealants, plastic additives and catalysts; (c) life sciences products, such as,

pharmaceuticals, pesticides and products of modern biotechnology; and (d) consumer care products, such as, bleaches, soap, fragrances, detergents, hair and skin care products. This categorization will also be used in the stratification of the sample.

Kenya's manufacturing sector contribution to the GDP is at around 10 percent. According to the Kenya National Bureau of Statistics, the chemical sector contributes 7 percent to the overall manufacturing sector GDP contribution (KNBS, 2017). With continuation in Kenya's economic development, production and use of chemicals will probably be the single most factor that will pose significant negative effects to the environment and human health unless the risks relating to chemicals are addressed (GOK, 2011).

1.2 Research Problem

Over the last two decades, methods for amassing and implementing environmental capabilities and practices continue to attract increased attention and discussion (Schiederig, Tietze & Herstatt, 2011). According to Freeman (2010), corporate stakeholders (internal and external) drive the need for an equilibrium between economic prosperity and environmental sustainability. For example, greater energy efficiency will reduce a firm's cost and enhance competitiveness.

Climate variation is one of the biggest global challenge of our time and Kenya has not been left unhurt by this occurrence as existing data show rising temperature, irregular and unpredictable rainfall, retreating glaciers and frequent occurrence of droughts and floods (GOK, 2013). Despite the government's efforts coupled with other stakeholders' initiatives to curb deterioration of the environment, green growth remains an elusive goal for the country. While enquiring into complaints of environmental pollution by London Distillers Kenya Ltd, the Departmental Committee on Environment and Natural Resources observed that: (a) industrial pollution is one of the leading causes of pollution worldwide and a serious threat for the planet; (b) the activities of manufacturing industries are creating catastrophic water and air pollution with adverse effects on health of humans and biodiversity; (c) air pollution emanating from London Distillers Kenya Ltd was not only a nuisance to the people residing around the company but also posed serious health consequences on them (GOK, 2018). Cases of companies disposing untreated effluent containing toxic chemicals and laden with heavy metals in the country's rivers are also on the rise. In August 2019, the National Environment

Management Authority (NEMA) clamped down Modern Lithographic (K) Ltd, Apex Ltd, Thorlite Kenya Ltd and Kamongo Paper Recycling Company whereas Chloride Exide company was served with "improvement orders" for disposing untreated toxic effluent into Nairobi River following an expose on pollution by the Nation Media Group (NMG) dubbed "Toxic Flow" (Onyango, 2019). In the earlier highlighted case of London Distillers Kenya Ltd, the Departmental Committee on Environment and Natural Resources made far reaching recommendations which inspired this study including but not limited to: (a) the company should invest in state-of-art technologies to eliminate air pollution and recycles solid waste; (b) the company should put in place stringent internal self-regulation measures; (c) the company should strictly comply with the countries environmental laws; (d) the company should dispose waste safely and in a healthy way; (e) the company should promote a 'green' corporate culture by reducing, recycling and reusing waste; (f) the company should employ the best technology to clean industrial waste before release to the environment; (g) the company should implement procedures for assessing the impact of its activities in relation to its environmental, health and safety policies; (h) the company should conduct internal and third party audits of the progress made towards protecting the environment (GOK, 2018).

Though the government has highlighted green innovation as one of the key strategies to achieving green growth in Kenya (GOK, 2013), its implementation by Kenya firms has not been investigated. Since stakeholders have varying influence on green innovation practices adoption (Weng, et al., 2015), it is necessary to find out their influence on adopting green innovation practices in the chemical manufacturing firms in Kenya. The chemical manufacturing sector is suitable for this study as it is considered to have serious implications on both the environment and human health (GOK, 2013). It is also regarded as a "high tech" industry that relies heavily on research and development (R & D) to spur innovation (OECD, 2001).

Researchers have investigated green innovation implementation and performance using a variety of methods and statistics in different business sectors. Jaffe & Palmer (1997) explores regulatory driven green innovation. Whereas, Horbach (2008) explores firms internal and external green innovation drivers. Other studies have gauged the potential impact towards organizational performance (Cheng, Yang & Sheu, 2014; Doran & Ryan, 2014). Moreover, other researchers have dwelt on the effect and interdependence

of diverse green innovations types such as green process, green product and green organizational innovations (Doran & Ryan, 2014; Horbach, Rammer & Rennings, 2012).

Buysse and Verbeke (2003) notes that Stakeholder pressure has the ability of influencing a firm's ecological strategy. Traditional green innovation adoption frameworks have repeatedly shown the strong explanatory power of stakeholder pressure (Weng & Lin, 2011). Weng at al., 2015 did a survey of service and manufacturing companies in Taiwan focusing on stakeholder's pressure and found positive significant effect on green innovative practices from employees, government, and competitors. A study by El-Kassar and Sign (2017) found that stakeholder's perspective had a direct effect on green process and green product innovation whereas demand for green products by the market had a positive significant effect on green process innovation and a little positive effect on green product innovation. A study by Kuo and Chen (2016) found that customers pressure and shareholder pressure exerted a significant positive impact on green innovation practices whereas government's regulations and incentive did not have an impact. Weng and Lin (2011) did a study of SMEs in China and found that green innovations adoption is significantly influenced by the quality of employees, customer pressure, support from within the organization, governmental incentives and regulatory pressure. Omar and Othman (2016), did a study on environmental innovation practices in Malaysian Chemical industry and found that stakeholder pressure was a key antecedence in affecting eco-innovation practices.

Despite green innovations still being a new research area (Diaz-Garcia et al., 2015), most of existing literature are from Europe with studies from emerging manufacturing hubs and innovation centers such as China, India and Taiwan currently on the rise. Existing innovation research has focused on innovation practices in developed economies (Weng et al., 2015) thus offering only little evidence on less developed countries. Considering the role played by green innovation in environmental protection and organizational competitiveness it is vital to comprehend the specificities of green innovation in firms competing in nascent economies. According to Fikru (2014), different business cultures and industry specific challenges cause environmental practices of companies to differ across regions and industry. Environmental issues for developing countries need to be treated differently from developed countries (Fikru, 2014). The study aimed to close the gap by generating empirical evidence relevant to

nascent economies like Kenya by surveying chemical manufacturing companies in Kenya.

The study sought to answer the following questions: (a) What is the extent of adoption of green innovation practices by chemical manufacturing organizations in Kenya? (b) What is the effect of stakeholders' pressure on green innovation practices adoption in the chemical manufacturing companies in Kenya?

1.3 Research Objectives

The research sought to establish the determinants of green innovation with a focus on the influence of stakeholders' pressure on green innovation practices. The specific objectives were: -

(a) To determine the extent to which chemical manufacturing firms in Kenya have adopted green innovation practices.
(b) To establish the effect of stakeholders' pressure on adoption of green innovation practices in the chemical manufacturing companies in Kenya.

1.4 Value of the Study

Kenya has affirmed its commitment to sustainable development with transition to a green economy (in line with the outcome of Rio +20 summit which was held in Rio de Janeiro in 2012) being among its top agendas (GOK, 2016). Green innovation has been highlighted as one of the critical practices towards sustainable development and protection of the ecosystem. The study therefore aimed to promote green innovation and encourage green growth in the country by providing policy makers with useful information for developing effective environmental policies.

Additionally, the thorough examination of chemical manufacturing firms in Kenya would help policy makers in developing a more vigorous sector specific environmental policy.

Lastly, studies on green innovation have not taken hold in the nascent economies. Thus, the study seeks to enhance the literature by examining drivers and mechanics of green innovation in the context of nascent economies.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Considering the global demand for sustainable development and green growth, this chapter delves into literature concerning the problem of various stakeholders effect as determinants of green innovation in chemical manufacturing entities in Kenya. This chapter covers theoretical corroboration on influencers of green innovation and empirical evidence from extant literature on various environmental aspects.

2.2 Theoretical Framework

In recent years the topic on greening the Supply Chain has received increased attention. Extant literature shows that growing public interest on environmental wellbeing, demand for transparency on sustainability of marketed products and environmental legislation calls for companies to pursue various environmental strategies. Innovation is considered as one of the crucial sources of competitiveness and a cure to current and future global challenges like climate change, decline in stock of non-renewable resources, population growth, water scarcity, and environmental deterioration (Schiederig et al., 2012). Green innovations types range from green product innovations, green processes innovations, green organizational innovations, green marketing innovations, green social innovations to green institutional innovations (Urbaniec, 2015).

2.2.1 Stakeholder Theory

The word "stakeholder," as used today, was pioneered by the Stanford Research Institute (now SRI International, Inc.), in 1963 in an internal memorandum (Freeman,1984). The purpose was to challenge the idea that management only needed to be responsive to stockholders at the expense of other groups (Parmar, Freeman, Harrison, Wicks, Purnell & De Colle, 2010). Freeman (1984) proposed the application of a vocabulary based on the "stakeholder" concept. Stakeholders are referred to as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984, p. 46).

Stakeholder theory stresses that companies need to put the interests of a wider spectrum of groups and individuals into consideration while making decisions instead of only focusing on meeting the needs of the shareholders' (Donaldson, Preston, & Preston, 1995). According to Porter & Linde (1995), firms need to focus their resources only on

key stakeholders and avoid paying too much attention on unnecessary interest groups or individuals. Proper administration of relationships with stakeholder not only contributes to business survival and profitability in the competitive business environment but is also a moral undertaking as it relates to: choice, values, and potential benefits and harms for groups and individuals (Phillips, 2003). Sirgy (2002) classifies stakeholders into three groups, namely; Internal stakeholders such as employees, management team and board of directors; External stakeholders who include suppliers, shareholders, local community and the environment and Distal stakeholders such as competitors, consumers and government.

Freeman (2010) stakeholder's model illustrates the various stakeholders that affect a company that must be managed as a whole and have different demands and influence.

Fig. 2.1 Stakeholder Map

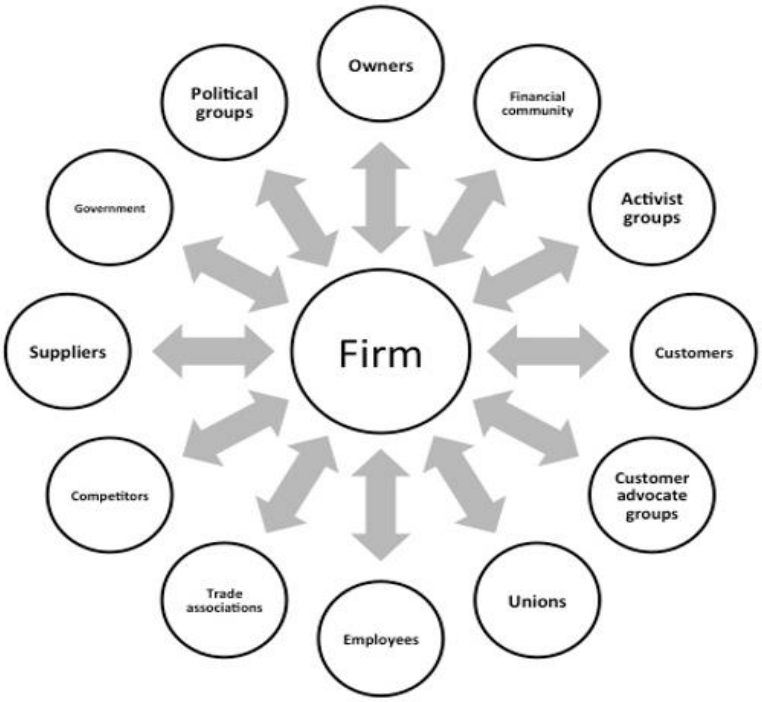


Figure 1: Stakeholder Map Adapted from Freeman, 1984

2.2.2 Institutional Theory

Scott (1995, pg. 33) asserts that "institutions are social structures that have attained a high degree of resilience". They constitute cultural-cognitive, normative, and regulative factors which provide meaning and stability to social life when combined with related activities and resources (Scott, 1995). According to Jeppeson (1991), institutions are transmitted through different types of carriers. Scott (2001) identified four institutional carriers, namely (a) Symbolic systems (such as laws, regulations, norms and expectations); (b) Relational systems (such as governance and authority systems, structural isomorphism, identities); (c) Routines (such as standard operating procedures, protocols, job description, code of conduct), and; (d) Artifacts (such as objects meeting required specifications, conventions and standards and objects carrying symbolic value). An example of an institutional carrier affecting firm's green innovation are standards like the internationally established environmental management standard (ISO 140001). Other examples are the written policies such as a firm's environmental, health and safety policy. According to Scott (2001), institutions may be carried by structured activities in the form of habitualized behaviour or routines.

External stakeholders cause decisions to be made under pressure by managers (Scott, 1995). A theoretical view that captures the impact of social networks explains organizational behaviors more comprehensively than the rational view which only captures the economic aspect (Chu, Yang, Lee & Park, 2017).

DiMaggio and Powell (1983) associated pertinent stakeholders with institutional theory and suggested division of key causes of institutional pressures on management into coercive pressure, normative pressure and mimetic pressure. Coercive institutional pressure relates to societal and cultural expectations facing a firm such as government agencies, standards and regulations (DiMaggio & Powell, 1983). Normative pressure arises from professional codes that presume compliance with specific guidelines whereby social legitimacy creates expectations on a company to follow or meet its external stakeholder's norms, standards and expectations (DiMaggio & Powell, 1983). Normative pressure is shaped by customer pressure (Zhu & Sarkis, 2007). Mimetic pressure occurs when a firm benchmark with better performing industry competitors or imitates the behaviors of other network members (DiMaggio & Powell, 1983). According to DiMaggio & Powell (1983), when an organization is not able to clearly

set its organizational goal or understanding a technology, it is likely to imitate other companies.

2.2.3 Natural Resource Based View

Adrews (1971) established that competitive advantage relies on the association between unique firm's internal capabilities and dynamic external (environment) conditions. Ulrich and Lake (1991) reemphasized the strategic need for discovery, administering and leveraging "core competencies" rather than focusing only on products and markets. The Resource-based view escalates this reasoning by pinpointing that sustainable competitive advantage can only be achieved through supporting the capabilities that create competitive advantage with resources (physical, financial and human) that are not easily imitable by competitors (Rumelt, 1984). The Natural resource-based view (NRBV), a hybrid of Resource-based view (RBV), needs to be highlighted when dealing with environmental issues (Singh & Chadran, 2017). According to Conner (1991), a firm's exclusive internal innovation capability and growing resource capacity solidifies its strategic position. Hart (1995) expanded RBV by including the natural environment. According to Conner (1991), firm capabilities that support sustainable environmental corporate activities will be the anchor for future strategy and competitiveness.

Where RBV stresses the needs for firms to direct their efforts on core competencies, NRBV, which is related to environmental innovation studies, focuses on competencies such as environmental knowledge, green skills, effective environmental strategy, strategic collaborations among others which lead to effective eco-innovation process (Singh & Chadran, 2017). Difficulty by competitors to copy these resources will honor an enterprise with a competitive edge (Singh & Chadran, 2017).

2.3 Green Innovation Practices

According to Horbach (2008) green innovations may be intended or explicit goals of an organization or unintended side-effects. The definition of green innovation emphasizes both environmental and economic aims of such an innovation (Singh & Chadran, 2017).

The Oslo manual (OECD/Eurostat, 2005, p. 146) defines innovation as "the implementation of a new or significantly improved product (good or service), or

process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations".

Further to the above definition, the OECD (2009) report on sustainable manufacturing and eco-innovation defined eco-innovation as "the creation or implementation of new, or significantly improved, products (goods and services), processes, marketing methods, organizational structures and institutional arrangements which - with or without intent - lead to environmental improvements compared to relevant alternatives" (OECD, 2009, p. 19).

Andersen (2010), defined green-innovations as developments that draw "green rents" from markets. Andersen (2010) noted two ways by which innovative companies can achieve benefits in the market from eco-friendly investments: (a) putting a premium for their "green reputation" or green products; and (b) greater resource efficiency through lowering production costs (Andersen, 2010, p. 8). This definition alludes that greater efficient consumption of energy and resources results into lowering of material costs besides motivating innovativeness. Based on Oslo manual (OECD/Eurostat, 2005) innovation may generally be categorized into product, process, organizational and marketing.

Green product (good/service) innovation is launching of a product that is new or with immense superior characteristics, designing products that minimize negative environmental impacts and consume fewer resources (eco-design), replacing inputs with superior eco-friendly materials and shared resources such as car sharing (Urbaniec, 2015).

Green process innovation is the roll out of novel or substantially enhanced manufacturing and logistics methods, that not only lead to a reduction in material consumption and supply risks but also results in cost savings (Urbaniec, 2015). It also entails replacement of hazardous or toxic materials during production, optimization resource efficiency during production and minimizing negative impacts of production outputs (Urbaniec, 2015).

Green organizational innovation entails implementation of management systems and organizational processes that respond to production and product environmental issues such as environmental management, auditing systems, pollution prevention schemes,

chain management and collaborations to improve environmental performance (Urbaniec, 2015).

Green marketing innovation is the implementation of novel marketing techniques which result in alterations in product and packaging design, product placement, product promotion and product pricing guided by environmental principles (Urbaniec, 2015).

Ramus (2001) categorizes green innovation types as (a) those that decrease environmental impact of the firm such as reuse and recycling, (b) those that solve a firm's environmental problem such as reducing hazardous substances or (c) those that develop eco-efficient products / services such as fewer resources and less energy intensive. Green innovation has also been categorized in terms of (a) technology use (end-of-pipe applications such as pollution control technologies, waste management and recycling), and (b) clean technologies (Kemp & Arundel, 1998).

Considering the numerous classifications of green innovations, this study investigated green product innovations, green organizational innovations and green process innovations as ways of reducing environmental pollution.

2.4 Stakeholders Pressure on Green Innovation Practices

Consumers environmentalism is creating demand for environmentally friendly products and readiness to pay a premium for them (Chang, 2011). Customers' demands for "green" challenges firms to reevaluate their product design, production, marketing methods and end-of-life management of products (Sarkar 2013). Customer demand has been found to be the most effective propellant of green innovation pertaining product and process as explained by Horbach et al. (2012). Additionally, the extent of a company's implementation of environmental protection activities is induced by the severity of regulations (Khanna, Deltas & Harrington, 2009). The anticipation of stringent policies may cause companies to be more innovative (Weng et al., 2015). In addition, the extent of government ecological incentives and environmental regulations enforcement plays an important part in in the enforcement of government's ecological regulations and rules (Weng et al., 2015). Zhu & Sarkis (2007) found that government pressure to be one of the most significant influencer of eco-practices.

Environmental practices are usually initiated by employees and firms will find it difficult to achieve environmental goals if employees don't support their policies (Zhu & Sarkis, 2007). Employees and top management's environmental commitment

promotes innovative solutions to improve a firm's green image (Chan, He, Chan & Wang, 2012). According to Pujari (2006), upstream environmental conduct impacts on a firm's green innovation implying that purchased production inputs largely affect the quality, cost, lead times, designing of the product, cycles development, market convenience, and competitiveness of the final services and goods. Suppliers can decide not to distribute products to companies that they deem to be environmentally irresponsible (Huang, Ding & Kao., 2009). Supplier involvement in the design and execution of green innovations impacts a firm's effective implementation and leads to realization of cleaner production and better environmental performance (Huang et al., 2009).

Competitiveness has also been pinpointed as a main motivation for environmental responsiveness (Hojnik, 2017). Enterprises normally react and respond to their competitors' actions hence they need to be up-to-date with their rivals' offerings, their industry standards and new developments in the market in order to remain competitive or outperform them (Weng et al., 2015). Firms are therefore compelled to reassess their present environmental responsibility status and pursue options that will help them match new environmental practices adopted by their competitors (Huang, et al., 2009). Yalabik, Baris and Fairchild (2011) found that competition propels green innovation especially where customers are environmentally sensitive. Whereas Li (2014) established that pressure arising from competitors affects green innovation practices positively.

Additionally, previous studies confirmed that pressure from various stakeholder including customers, government, employees, suppliers, and competitors propel green innovation practices (Hsu, Tan, Zailani & Jayaraman, 2013; Weng et al., 2015). Consequently, this paper sought to contribute in the comprehension of how stakeholder pressures influence firm green innovation practice to improve their environmental performance.

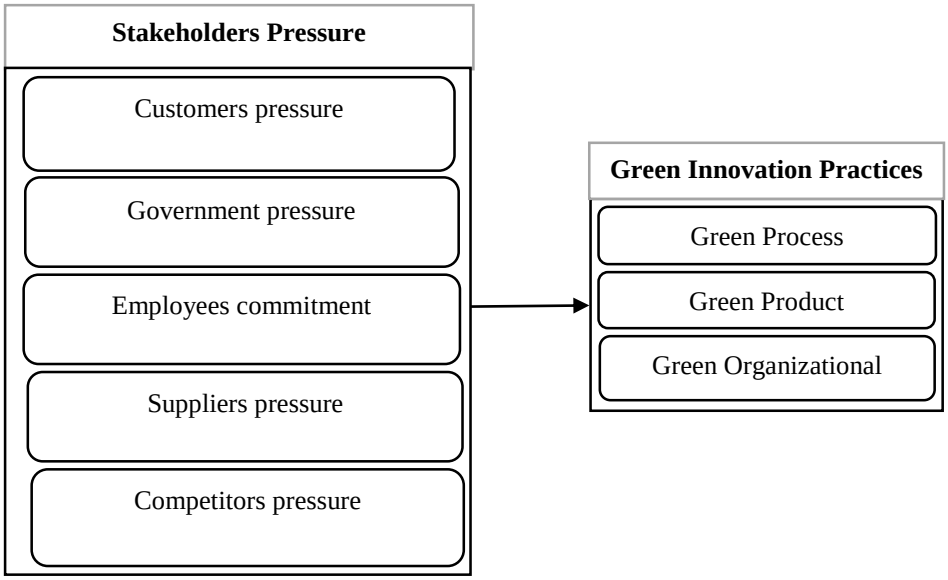
2.5 Proposed Conceptual Framework

Morsing and Schultz (2006) states that the long run value and sustainability of a firm is enhanced by its collaborations with key stakeholders and that the importance of each stakeholder may vary with the prevailing circumstances. The study by Henrique and Sadosky (1996) found that stakeholder pressure motivates the actions of a firm.

The proposed green innovation framework for the study consisted two primary constructs: Stakeholder's pressure and green innovation practices. Green innovation adoption can be described as an organization's decision to respond to environmental issues by applying green innovation practices. The study focused on green process innovation practices, green product innovation practices and green organizational innovation practices. Stakeholders pressure was measured by inquiring the environmental pressure exerted by customers, government, employees, suppliers and competitors. Customer's pressure inquired how concerns about the environment by a firm's customers influenced its adoption of green innovation practices. Government pressure inquired the effect of regulations stringency and government incentives on adoption of green innovation practices. Employees' pressure queried pertaining ecological consciousness and commitment to ecology among employees and management. Supplier's pressure inquired how concerns about the environment by a firm's suppliers affected its adoption of green innovation practices. Competitors' pressure inquired how competitors' actions towards the environment and innovation to gain competitive edge influenced an entity's green innovation practices.

The measures of dependent and independent variables were adopted from three previous studies (Sehnem, Lazzarotti & Bencke, 2016; Leonidou, Christodoulides, Kyrgidou & Palihawadana, 2015; Chen, Lai & Wen, 2006). The study aimed to establish the extent of adoption of green innovation practices by chemical manufacturing firms in Kenya and determine the influence of stakeholders' pressure upon adopting green innovation practices. Figure 2.2 demonstrates the proposed framework of the constructs.

Fig. 2.2 Proposed Conceptual Framework



Source: Developed from Weng et al. (2015)

Previous studies have indicated that the pressure applied by diverse stakeholders has a positive correlation with the green innovation practices (Weng et al., 2015; Omar & Othman, 2016). Thus, this study postulates the following hypothesis: -

H1: Customers pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

H2: Government's pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

H3: Employees pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

H4: Suppliers pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

H5: Competitors pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The section discusses the techniques applied to the study. The chapter expounds the blueprint for the research, gives the population to be studied, the applied sampling method, procedures and instruments utilized to gather data.

3.2 Research Design

Research design is the outline that specifies the techniques and series of steps for gathering, measuring and analyzing data (Kothari, 2004). It guarantees the relevance of the study to the problem and enables the use of economical procedures to gather and analyze data (Ngwiri, Jomo & Mputhia, 2016)

Cross sectional research design was employed to explore the effect of stakeholders' pressure on green innovation practices adoption among chemical manufacturing companies in Kenya. A cross sectional design entails obtaining data from a given population to study variables of interest at a certain time (Babbie, 2010). A cross sectional study is an observational study and often considered descriptive. It is usually defined as a "snapshot" of a population in a given instant in time, often carried out to measure the degree of the result of interest for the targeted population, suitable for examining hypotheses as they need relatively fewer resources and shorter time, and the respondents are just chosen on the basis of the inclusion and exclusion criteria laid out for the research (Levin, 2006).

Levin (2006, p. 24), opines that "a cross-sectional study design is used when the purpose of the study is descriptive, often in the form of a survey". Descriptive research (a) aims at describing phenomena, in its natural form, without altering them; (b) the researcher observes and describes what he finds; (c) address the queries, how, what, when and where; (d) aids in studying current situation; (e) may be concerned with the views (of a person) towards the elements under study (Akhtar, 2016).

The study was designed to gather quantitative data from managers who were thought to be more knowledgeable on the topic of green innovation as innovation is normally spearheaded at the strategic or top management level. The data was used to establish whether the five postulated determinants of green innovation (government pressure,

competitor pressure, supplier pressure, customer pressure and employee pressure) influenced its adoption.

3.3 Study Population

The population of the study consisted of the chemical manufacturing companies in Kenya. According to Kothari (2004), the universe of the population constitutes every single the items in the field to be inquired. According to OECD (2001), the chemicals industry is quite diverse and can be categorized into four major categories: (a) basic (or commodity chemicals); (b) specialty chemicals, such as, coatings, electronic chemicals, adhesives and sealants, plastic additives and catalysts (c) life sciences products, such as, pharmaceuticals, pesticides and products of modern biotechnology; and (d) consumer care products, such as, bleaches, soap, fragrances, detergents, hair and skin care products.

The population of the study was obtained from the Kenya Association of Manufacturers (KAM) (manufacturersandexportersdirectory.com, 2019). In addition, chemical manufacturers not registered with the KAM were identified from the Official Yellow Pages Kenya (yellowpageskenya.com, 2019). The identified firms were stratified into 4 major categories which are base chemicals, the fine and specialty chemicals, the consumer care products and the life sciences chemicals (pharmaceuticals and agrochemicals) (OECD, 2001). The categorization enabled the researcher to observe existence of variabilities in the extent of the stakeholders' influence on green innovation. Since the target population was the chemical manufacturing companies in Kenya, companies registered with the KAM under the Chemical and Allied Sector and the Pharmaceuticals and Allied Sector but not involved in manufacturing activities (such as distributors, suppliers of specialized packaging materials and manufacturers of pharmaceutical equipment) were excluded. The inclusion or exclusion criteria was based on internet and website search of the enterprises business activities. Table 3.1 provides the 4 sub-sectors stratification and the population per sub-sector.

Table 3.1: Classification of chemical manufacturing firms

S/No.	Sector	Target Population
01	Base chemicals	6
02	Fine & Specialty chemicals	35
03	Consumer care products	26
04	Life science (agrochemicals & pharmaceuticals)	35
	Total	**102**

Source: Researcher (2019)

3.4 Study Sample

According to Kabir (2016), the required representation of various population sub-groups is attained by the researcher through stratified random sampling. Since the total population was spread over 4 groups of varying sizes, the sampling frame was arranged by the four groups into different strata. This method enabled the author to achieve fair, random and proportionate representation of the sub-groups fairly within the sample (Kabir, 2016)

Stratified simple Random sampling was adopted in selecting samples. This method enabled an equal opportunity of representation of all the population's representatives (Kabir, 2016). For each of the 4 strata's, the researcher first obtained a full list of members of the population before obtaining stratum sample sizes as provided in table 3.2. Given the limitations of time and resources, a representative sample was calculated using probability sampling method. Yamane (1967) gives a simple formula for sample size calculation (provided here below) which was used to in coming up with the size of the sample for the study.

$$n = \frac{N}{1 + N(e)^2}$$

Where, n is the size of the sample size, N size of the population, and e is the level of precision (assumed to be 5% for this study) of precision. Saunders et al., (2009) explains that if any sample is carefully chosen 100 times, at least 95 percent of the samples is

supposed to give a true representation of the characteristics of the population. Therefore, the margin of error of the paper was 5% (0.05).

Therefore, n = 102/ [1+102(0.05)^2] = 81.27 =81

Base Chemicals sample size = 6/100 x 81 = 4.86

Fine & Specialty Chemicals sample size = 35/100 x 81= 28.35= 28

Consumer Care Products sample size = 28/100 x 81 = 21.06 = 21

Life Science (Agrochemicals & Pharmaceuticals) sample size = 35/100 x 81= 28.35= 28

A proportionate stratified random sample was picked from each cluster (category). Table 3.2 presents the sample size distribution.

Table 3.2: Sample size distribution

S/No.	Sector	Target Population	Sample Size
01	Base Chemicals	6	5
02	Fine & Specialty Chemicals	35	28
03	Consumer Care Products	26	21
04	Life Science (Agrochemicals & Pharmaceuticals)	35	28
	Total	**102**	**82**

Source: Researcher (2019)

3.5 Data Collection

Primary data was used in the study and it was obtained through self-administered questionnaires. Closed and open-ended questionnaires were employed in obtaining useful information about the study population (Kombo & Tromp, 2015). The targeted respondents were managers in either Supply Chain Management or Environmental Management or Operation Management or Research & Development. This group was deemed to be familiar with the green innovation concept hence likely to provide more informed responses to the study.

Each question on the questionnaire was designed to respond to the study's objectives. The questionnaires had different parts: Part A: Company general and demographic

information; Part B: Green Innovation Practices (product, process and organizational); and Part C: Stakeholders' Pressure. To guarantee content validity of the data collection tool, academic and industry experts were requested to review the questionnaire.

3.6 Data Analysis

Descriptive statistics including measures of central tendencies and measures of dispersion (mean and standard deviation respectively) were used to analyze the extent to which chemical manufacturing firms in Kenya had adopted green innovation practices while regression analysis was used to determine the effect of stakeholders' pressure on green innovation practices among chemical manufacturing firms in Kenya. The findings were presented in tables.

Regression formula: $Y= a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e$

Where: Y = green innovation practices, a = y intercept when x is zero, b_1 to b_5 = weights relating to stakeholders' pressure, x_1 = customers pressure, x_2 = government pressure, x_3 = employees pressure, x_4 = suppliers pressure, x_5 = competitors pressure, whereas e = error term.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

The data obtained for the study was analysed to arrive at results which were further interpreted based on the objectives of the research. Data was gathered from chemical manufacturing firms in Kenya and the findings obtained were analysed using descriptive statistics and results were presented through tables.

4.2 Response Rate

Eighty-two (82) questionnaires equivalent to the sample size were administered proportionately and randomly across the four sub-sectors of the chemical industry through drop and pick method. The respondents were given one week to respond to the questionnaire. Out of the 82 administered questionnaires, 66 were obtained duly filled. This represented a response rate of 80.48% and it was deemed reasonable for generalization of the outcome.

4.3 Demographics and Background Information

The questionnaire's Section A sought some background information on: management position of the respondents, company's age and presence or absence of ISO 140001. Analysis of this information helped to establish the general profile of chemical manufacturing firms in Kenya. The outcome on demographics and background information are presented and explained in the following sub sections.

4.3.1 General Information of Respondents

Table 4.1 below gives a summary of the general details concerning those individuals who took part in the study.

From Table 4.1, all the respondents were managers in their respective departments of Supply Chain, Operations, Logistics and Innovations. 27.75% indicated that they had worked for two years and below, 21.21% had worked for periods between 3-5 years, 30.13% had worked for 5 -10 years and the remaining 22.73% had worked for 10 over a decade. 72.25% of the respondents had worked for 3yrs and above in their respective chemical manufacturing firms in Kenya and thus they were in a better position to know how things work and give relevant information for the study.

Table 4.1: General Information of Respondents

Classification	Category	Frequency	Percentage
Job Title	Supply chain manager	21	31.82
	Operations manager	17	27.76
	Logistics manager	13	19.69
	Innovations manager	15	22.73
	Total	**66**	**100.0**
Years of Experience	Less than 2 years	17	27.76
	3-5 years	14	21.21
	5-10 years	20	30.13
	Over 10 Years	15	22.73
	Total	**66**	**100.0**

Source: Research Data (2019)

4.3.2. General Information of the Firms

Table 4.2 summarizes the outcome on the general information of the studied firms.

Table 4.2: General Information of the Firms

Classification	Category	Frequency	Percentage
Length of Organizational Existence	Less than 5 years	19	38.78
	5-10 years	27	40.90
	Over 10 Years	20	30.30
	Total	**66**	**100.0**
Number of Employees	Less than 50	17	27.75
	51-100 employees	10	15.15
	101-500	17	27.75
	Over 500	22	33.33
	Total	**66**	**100**
Is the company ISO 14001 Certified	Yes	20	30.3
	No	46	69.69
	Total	**66**	**100.0**

Source: Research Data (2019)

The findings show that 38.78% of the firms had been operational for less than 5yrs, 40.9% has been in existence for 5 -10 years while the remaining 30.3% of the firms had existed for over 10 years. 71.2% of the firms have been operational for above 5 years and thus had knowledge on how outside pressure can impact the adoption of some of the practices in the institution. 27.75% of the firms had less than 50 employees while 72.25% of the chemical firms had over 50 employees in their firms. This means that the employees were in a better position to influence decisions in the organization and influence adoption of green innovation practices. On whether the firms were ISO 4001 certified, the respondents indicate that 30.3% were ISO Certified while the remaining

69.69% did not have ISO 14001 Certification. This means that the level of awareness of environmental certification in the chemical manufacturing firms is low.

4.4 Green Innovation Practices

The study sought to establish the extent to which chemical manufacturing firms in Kenya had adopted green process innovation practices, green product innovation practices and green organizational innovation practices. A Likert scale of 1-5 (where 1= No extent, 2 = Small extent, 3 = Moderate extent, 4 = Large extent and 5 = Very large extent) was used to capture the respondents view. The findings were as presented in table 4.3.

The findings illustrate that Green Process Innovation has generally been adopted to a large extent in the production processes of chemical manufacturing companies in Kenya. This is indicated by the means (M) and standard deviations (SD) of the four statements employed to establish its level of adoption. This was realized by treating and recycling wastes (M= 4.11, SD= 1.01), minimization of hazardous materials emission (M=4.03, SD=1.04), use of clean and renewable technology (M= 3.97, SD=1.04) and resource optimization (energy, water and materials) with a mean of 3.64 and SD of 1.21.

Green Product Innovation has also been adopted to a large extent as indicated by the respective means and SDs of the four statements used to establish its level of adoption. This has been achieved through frequent update of Products, services and packaging to enhance environmental performance (M= 3.98, SD=1.17), recovery and proper disposal of end-of-life or expired products (M= 3.91, SD=1.13), eco-labeling (M= 3.88, SD=1.10) and use of environmentally friendly material in making of products (M= 3.71, SD=1.06).

Green Organizational Innovation was equally adopted to a large extent. This has been achieved by implementing product life cycle analysis (M= 4.05, SD=0.99), implementing collaborative business networks (M= 4.02, SD=1.03), implementing environmental and social accounting (M= 3.80, SD=1.17), implementing pollution prevention measures (M= 3.58, SD=1.20), and implementing environmental management and audit system (M= 3.53, SD=1.13).

This means that generally, the chemical manufacturing firms in Kenya have adopted Green Innovation practices in their processes to a large extent. However, there is need

for chemical manufacturing firms to engage in more green innovations so as to gain a sustainable competitive advantage and be able to conserve the environment for the future generations. To achieve greater environmental benefits, firms should direct more effort and resources in green innovation initiatives with a mean score of less than 4 and continuously pursue new or improved eco-innovations. The standard deviations for all items is small meaning that on average the values in the statistical dataset are close to the mean of the dataset.

Table 4.3: Green Innovation Practices

Green process innovation	**Mean**	**Std. Dev**
Wastes are treated and recycled in the production process	4.11	1.01
Hazardous substance emission is minimized in the production process	4.03	1.04
Use of cleaner or renewable technology in the production process	3.97	1.04
Energy, water and material optimization in production process	3.64	1.21
Green product innovation		
Products, services and packaging are frequently updated to enhance environmental performance	3.98	1.17
Company recovers its end-of-life and expired products for reuse or proper disposal	3.91	1.13
The company uses eco-labeling	3.88	1.10
Environmentally friendly materials (i.e. less polluting, less toxic, easy to reuse) are used to make products.	3.71	1.06
Green Organizational Innovation		
Analysis of the product lifecycle	4.05	0.99
Create collaborative business networks	4.02	1.03
Environmental and social accounting	3.80	1.17
Pollution prevention measures	3.58	1.20
Environnmental management and environmental audit system	3.53	1.13

Source: Research Data (2019)

4.5 Stakeholders Pressure and Green Innovations

The second objective aimed at determining the extent to which stakeholders' pressure impact the adoption of green innovation practices. The subsequent tables present the results of the data analysis. The analysis focused on the regression model summary, ANOVA analysis and regression Coefficients.

Table 4.4: Regression Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.7811[a]	.622	.689	1.72028

b. Predictors: (Constant), Customer Pressure, Competitor Pressure, Employee Pressure, Government Pressure, Supplier Pressure

Source: Research Data (2019)

Table: 4.5 ANOVA Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.580	4	3.193	18.442	.000[b]
	Residual	3.290	61	.173		
	Total	12.870	65			

a. Dependent Variable: Green Innovation

b. Predictors: (Constant), Customer Pressure, Competitor Pressure, Employee Pressure, Government Pressure, Supplier Pressure

Source: Research Data (2019)

Table: 4.6 Coefficient Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.542	1.253		2.827	.006
	X_1	.509	.563		4.559	.025
	X_2	.983	.141	.213	6.946	.078
	X_3	1.280	.117	.431	10.928	.125
	X_4	.985	.174	.232	5.655	.079
	X_5	1.458	.120	.388	12.114	.046

a. Dependent Variable: Green Innovation

Source: Research Data (2019)

The regression model summary of the study is shown in table 4.4. As shown in Table 4.4, the adjusted value of R square is 68.9%. This signifies that the regression model is statistically sound to the variations in Green Innovations. 69% of Green Innovation Practices is due to the stakeholder's pressure towards the Chemical Manufacturing Firms. This is therefore a significant fit as only 31% of the variation in Green Innovation Practices is unaccounted for.

Analysis of variance (ANOVA) provides statistical techniques which are used for testing the significance of a regression model. The results are shown in table 4.5. At 5% level of significance, Table 4.5 shows that the calculated value of F is 18.442 while F critical is 3.193. This thus means that the study model is statistically significant. It is supported by the p value of 0.00 which is less than 5%. This implies that Stakeholders pressure is a suitable predictor of Green Innovation

The regression coefficient was employed to bring out the individual independent variable effect on the dependent variable. The coefficient model shows how customer pressure, government pressure, employee pressure, supplier pressure and competitors pressure influence the adoption of Green Innovation. Table 4.6 implies that customer

pressure with the P value of 0.25 and t value of 4.66 and competitors pressure with the P value of 0.46 and t value of 12.11 have a positive and significant relationship with Green Innovation since all of them have a P value of less than 5% and t values which are greater than the p values. Government Pressure, Employee pressure and supplier pressure all have P values which are greater than 5% which means that they do not have a positive and relevant correlation with Green Innovation. This implies that customers are increasingly demanding environmentally friendly products and that businesses are conscious of this reality hence competing on the basis of meeting stakeholders demand for a clean environment and environmentally friendly products.

Managers should therefore pay more attention to meeting their customers demand for improved environmental performance and eco- friendly products. Similarly, competitors' environmental practices should be closely monitored as they have a significant influence on green innovation practices of chemical manufacturers. The findings of this study also call for a more proactive stance towards eradicating environmental harm by the other stakeholders *viz.* goverment, employees and suppliers. Chemical manufacturing firms in Kenya should cultivate a 'green' culture and develop 'green' competencies among its staff so that they can be agents of change in identifying and implementing green initiatives. The government would be interested in finding out why the existing regulations and incentives are not motivating green innovations in the chemical manufacturing companies in Kenya. Also, firms should collaborate with their suppliers in implementing green innovations along the supply chain.

The model shows that when all variables are held at constant, the value of stakeholders' pressure would be 3.542.

The established linear regression equation becomes:

$$\mathbf{Y = 3.542 + .509X_1 + .983X_2 + 1.280X_3 + .985X_4 + 1.458X_5}$$

Y= Green Innovations

X_1= Customer Pressure

X_2= Government Pressure

X_3= Employee Pressure

X_4= Supplier Pressure

X_5=Competitors pressure

4.6 Hypothesis Testing

The study adopted alternative hypothesis (H_1) which was tested using Chi Square. The Chi-Square test of independence is used to determine if there is a significant relationship between two nominal (categorical) variables. The frequency of each category for one nominal variable is compared across the categories of the second nominal variable. The results are presented in the subsequent tables.

4.6.1 Customer Pressure and Green Innovation

The study sought to test $H_1$1: Customers pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya. Table 4.7 indicates that the significance level or the p value is 0.00 which is less than 5%. This imply that customer pressure has a positive relationship with green innovations and thus the hypothesis is upheld.

Table 4.7: Customer Pressure and Green Innovation

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.446[a]	154	.000
Likelihood Ratio	19.976	154	.007
Linear-by-Linear Association	8.331	1	.000
N of Valid Cases	66		

a. 184 cells (100.0%) have expected count less than 5. The minimum expected count is .03.

Source: Research Data (2019)

4.6.2 Government Pressure and Green Innovation

The study sought to test $H_1$2: Government's pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya.

Table 4.8: Government Pressure and Green Innovation

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.032[a]	132	.060
Likelihood Ratio	17.121	132	.175
Linear-by-Linear Association	2.480	1	.120
N of Valid Cases	66		

a. 161 cells (100.0%) have expected count less than 5. The minimum expected count is .03.

Source: Research Data (2019)

Table 4.8 indicates that the significance level or the p value is 0.06 which is more than 5% (0.05). This imply that government pressure does not influence green innovations and thus the hypothesis is rejected

4.6.3 Employee Pressure and Green Innovation

The study sought to test $H_1$3: Employee's pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya. Table 4.9 indicates that the significance level or the p value is 0.121 which is more than 5% (0.05). This imply that employee pressure does not influence green innovations and thus the hypothesis is rejected.

Table 4.9: **Employee Pressure and Green Innovation**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.430[a]	154	.121
Likelihood Ratio	28.612	154	.072
Linear-by-Linear Association	4.495	1	.112
N of Valid Cases	66		

a. 184 cells (100.0%) have expected count less than 5. The minimum expected count is .03.

Source: Research Data (2019)

4.6.4 Supplier Pressure and Green Innovation

The study sought to test $H_1$4: Supplier's pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya. Table 4.10 indicates that the significance level or the p value is 0.08 which is more than 5% (0.05). This imply that supplier pressure does not influence green innovations and thus the hypothesis is rejected.

Table 4.10: **Employee Pressure and Green Innovation**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.504[a]	110	.089
Likelihood Ratio	18.487	110	.062
Linear-by-Linear Association	4.882	1	.101
N of Valid Cases	66		

a. 138 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

Source: Research Data (2019)

4.6.5 Competitor Pressure and Green Innovation

The study sought to test $H_1$5: Competitor's pressure impacts positively and significantly on green innovation practices among the chemical manufacturing firms in Kenya. Table 4.11 indicates that the significance level or the p value is 0.00 which is less than 5% (0.05). This imply that competitors pressure has a positive and significant relationship with green innovations and thus the hypothesis is upheld.

Table 4.11: **Competitor Pressure and Green Innovation**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	43.832[a]	176	.000
Likelihood Ratio	20.730	176	.042
Linear-by-Linear Association	3.050	1	.000
N of Valid Cases	66		

a. 207 cells (100.0%) have expected count less than 5. The minimum expected count is .03.

Source: Research Data (2019)

4.7 Discussion of findings

The study established that Green Process Innovation, Green Product Innovation and Green Organizational Innovations had been adopted to a large extent by the chemical manufacturing firms in Kenya. This agrees with the literature as Urbaniec (2015) indicate that Green product innovation facilitates in designing products that minimize negative environmental impacts and consume fewer resources (eco-design), replacing inputs with superior eco-friendly materials and shared resources. The researcher further notes that Green Process Innovation not only leads to a reduction in material consumption and supply risks but also results in cost savings. It facilitates in the replacement of hazardous or toxic materials during production, optimization resource efficiency during production and minimizing negative impacts of production outputs. Green organizational innovation helps a firm in implementing the systems of management and organizational processes that respond to production and product environmental issues such as environmental management, auditing systems, pollution prevention schemes, chain management and collaborations to improve environmental performance (Urbaniec, 2015). Generally, green innovation practices benefit a firm in a number of ways including putting a premium for their "green reputation" or green

products and having greater resource efficiency through lowering production costs (Andersen, 2010).

Raza & Murad (2014) acknowledge innovation as a crucial activity to establishing 'core competitive advantage' for fostering a company's long run-development. The need to gain a competitive edge has pressured companies to pursue innovation as a critical differentiation strategy (Wagner, 2008). Porter and van der Linde (1995) proffer that the costs incurred in ecological investments will be offset through increased product value arising from green innovations. An enterprise corporate image may as well be enhanced. Through green innovation, industry will obtain increased efficiency, cost savings, better product quality and increased productivity (Chiou, Chan, Lettice & Chung, 2011).

The results further indicate that Customer Pressure and Competitor Pressure influence the Chemical manufacturing firm's decision in adopting green innovation practices. Employee Pressure, Government Pressure and Supplier Pressure were found to have no influence on the decisions of Chemical manufacturing firms to adopt Green Innovation practices. The literature has consistent and contradictory studies based on the findings.

On customer pressure, the results are consistent with that of Sarkar (2013) who concluded that Customers' demands for "green" challenges firms play an important role in reevaluation of their product design, production, marketing methods and end-of-life management of products (Sarkar 2013). Horbach et al. (2012) adds that Customer pressure has been found to be the most effective propellant of green process and product innovations. The findings on government regulations were contradicted by that of Khanna et al. (20019) who note that the extent of a company's implementation of environmental protection activities is induced by the severity of regulations. Weng et al. (2015) adds that the anticipation of stringent government policies may cause companies to be more innovative. The researchers conclude that the extent of government environmental incentives and environmental regulations enforcement has an affirmative influence on companies' environmental policies. Zhu & Sarkis (2007) adds to the literature that supports the findings by stating that government pressure is one of the most significant influencer of eco-practices. Hojnik (2017) pointed out competitor pressure as one of the motivator for environmental responsiveness. Huang et al. (2009) posit that firms are compelled to reassess their present environmental

responsibility status and pursue options that will help them match new environmental practices adopted by their competitors.

On employee pressure, the findings contradict with the literature as Zhu and Sarkis (2007) established that green Innovations are usually initiated by employees and firms will find it difficult to achieve environmental goals if employees don't support their policies. Chan et al. (2012) also contradicts the findings by opining that Employees and top management's environmental commitment promotes innovative solutions to better an entity's green image. The literature on supplier pressure contradicts the findings of the study. Suppliers may decline to deliver goods to companies that they deem to be environmentally irresponsible (Huang, Ding & Kao., 2009). Supplier involvement in the design and execution of green innovations impacts a firm's effective implementation and leads to realization of cleaner production and better environmental performance (Huang et al., 2009).

The findings are supported by stakeholder's theory which states that the pressure exerted by an entity's stakeholders have an important role to play in decision making of companies. It has been established that customer pressure and competitor pressure play an important role in ensuring that chemical manufacturing firms adopt green innovation practices.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the study results are summarized, the researchers' conclusions are made and recommendations are provided by the researcher with consideration of the study outcomes. It also gives suggestions on the areas that were deemed wanting of further inquiry through research.

5.2 Summary

The paper`s objectives were analyzed in light of the responses obtained from firms that filled the questionnaire from. The main purpose was to investigate how stakeholders pressure influences the adoption of green innovation practices. The findings indicate that majority of the chemical companies are not ISO 14001 Certified. From objective one, it was established that Green Process Innovation, Green Product Innovation and Green Organizational Innovation have all been adopted to a large extent by the chemical manufacturing firms in Kenya. Some green innovation sub-practices which were adopted to a large extent include waste treatment and recycling in production process, having collaborative networks along the supply chain and having analysis of the product life cycle. Chemical manufacturing firms have also put in place pollution preventive measures and mechanisms for proper disposal of products which have reached end life. Use of eco-labelling and environmental friendly materials was also adopted by the firms to a moderate extent.

From the second objective, it was noted that Customer Pressure and Competitor Pressure positively and meaningfully influence the adoption of Green Innovation Practices in Chemical Manufacturing Firms in Kenya. Employee pressure, Government Pressure and supplier pressure were found to have no influence on green innovations. Customers demanded for improved environmental performance and eco-friendly products. Government also had regulations that limit the toxic emissions and thus the chemical firms were forced to adhere by them. Competitors were also found to be implementing environmental practices and at the same time marketing their products as using the eco-friendly front and thus this put pressure on other firms to also practice green innovations. From the Hypothesis, $H_1 1$ affirming the relationship between

customer pressure and green innovations and H_15 affirming the relationship between competitor pressure and green innovations were upheld. H_12 affirming the relationship between government pressure and green innovations, H_13 affirming the relationship between employee pressure and green innovations and H_14 affirming the relationship between supplier pressure and green innovations were rejected since they had a p value of greater than 0.05.

5.3 Conclusion

Based on the results, the author can conclude that most of the chemical manufacturing firms have adopted green innovation practices to a large extent. This is in sync with the literature which show that the adoption of green innovation practices enhances improved environmental performance and gives an entity competitive edge. It has also been established that stakeholders influence green innovations in chemical manufacturing firms to different extents. Customer pressure and pressure from competitors were found to have greater influence on the firm's decisions pertaining green innovations. Firms are therefore encouraged to workhand in hand with the customers, the government and monitor the competitor's activities for them to achieve the goal of being environmentally innovative. It can therefore be concluded that a firm needs pressure from external bodies for them to be able to adopt some practices and thus this external pressure is relevant to meet green innovations.

5.4 Recommendations

From the findings of the paper, it is recommended that chemical manufacturing companies needs to put more effort in adopting green innovations practices as it has been noted that its adoption gives entities competitive edge and improves the company's image. The study also endorses that chemical manufacturing firms need to work closely with customers and at the same time monitor the activities of competitors as these are the players who were noted to have greater influence on the green innovation adoption. Therefore, by firms paying closer attention to them and benchmarking with their competitors, they will implement the needed green innovations for sustainable growth which will in turn give them a competitive edge. The findings of this study also call for a more proactive stance towards eradicating environmental harm by the other stakeholders *viz.* goverment, employees and suppliers. Chemical manufacturing firms in Kenya should cultivate a 'green' culture and develop

'green' competencies among its staff so that they can be agents of change in identifying and implementing green initiatives. The government would be interested in finding out why the existing regulations and incentives are not motivating green innovations in the chemical manufacturing companies in Kenya. Also, firms should collaborate with their suppliers in implementing green innovations to reap greater environmental benefits along the supply chain. The study also recommends that the chemical manufacturing firms should put in place pollution prevention measures and deploy environmental management and environmental audit systems so as to improve their green organizational innovation performance. The firms should also direct greater attention the green product innovation practices to improve their environmental performance.

5.5 Limitations

Bureaucracy in some of the institutions that were targeted was a major hindrance to obtaining the information and the timely completion of the project. Some targeted firms were reluctant to share information. The adopted "drop-and-pick" method of administering the questionnaires proved to be costly in terms of financial resources and time. This however did not hinder the researcher from obtaining the required information as the response rate was sufficient enough for the study. The respondents were also guaranteed on the confidentiality of the information that they were giving and that it was strictly for academic purposes only.

During data collection, it was observed that the concept of green innovation was still new to most of the respondents. This may have had an impact on the quality of responses given and on the findings of the study.

Contextually, the study was limited to chemical manufacturing firms in Kenya and since they were many, sampling was done and thus the results might not reflect the true position of all manufacturing companies in Kenya. This is because the sampling in the subsectors of chemical manufacturing firms might not be equally done and thus some sectors had more respondents as compared to others.

Conceptually, the study was limited to the adoption of green innovation practices and did not focus of factors affecting implementation.

5.6 Suggestions for Further Research

Future research can focus on the variations of the pressure put by different groups and why some groups influence green innovation practices and others do not. For example,

in the case of government pressure, it raises the questions of whether government environmental regulations are stringent enough or whether there is proper enforcement in the least developing countries. Second, considering that each context has its own unique culture and dynamics, upcoming studies may examine the research model in different sectors or industries.

Third, considering the wide array of potential enablers of green innovation practices and the scarcity of research in the field especially in the least developed economies, future research may broaden investigation to include other potential factors.

Future research can use other research design other than descriptive which has the disadvantage of biasness. Other research method and mode of collecting information might give contrasting results.

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APPENDICES

APPENDIX I: RESEARCH QUESTIONNAIRE

The aim of the study is to evaluate the influence of stakeholders on adoption of green innovation practices in the chemical manufacturing industry in. Information provided will be used for academic purposes only. Confidentiality of the information given is guaranteed and will immensely contribute in promoting green innovation and encourage green growth in the country by providing policy makers with useful information for developing effective environmental policies.

PART A: GENERAL AND DEMOGRAPHIC DATA

1. Please tick your job title.

a) Supply chain manager ( )

b) Operations manager ( )

c) Logistics manager ( )

d) Innovations manager ( )

2. How long have you worked for your organization?

a) 1 – 2 years ( )

b) 3 – 5 years ( )

c) 5 -10 years ( )

c) Over 10 years ( )

3. For how long has this Chemical Manufacturing firm operated in Kenya?

a) Less than 5 years ( )

b) 5 – 10 years ( )

c) Over 10 years ( )

4.Is your organization ISO 140001 certified?

□ Yes □ No

5. How many employees are currently employed by your organization?

□ less than 50 □ 51 – 100 □ 101 – 500 □ over 500

PART B: GREEN INNOVATION PRACTICES

6.Below is a list of green innovation practices. Using a Likert scale of 1-5 (where 1=No Extent, 5=Very High Extent), indicate the extent to which your company has adopted the following green innovation practices. Tick as appropriate.

(1) No extent (2) Small extent (3) Moderate extent (4) Large extent (5) Very large extent

Green process innovation	**1**	**2**	**3**	**4**	**5**
Energy, water and material efficiency is adopted in the production process					
Hazardous substances emission is minimizes in the production process					
Use of cleaner or renewable technology in the production process					
Treatment and recycling of waste in the production process					
Green product innovation					
Ecologically friendly materials (i.e. less polluting, less toxic, easy to reuse) are used to make products.					
Products, services and packaging are frequently updated to enhance environmental performance					
The company uses eco-labeling					
Company recovers its end-of-life and expired products for reuse or proper disposal					
Green Organizational Innovation					
social and ecological accounting					
Measures that prevents pollution					
Systems pertaining ecological management and audits					
Analysis of the product lifecycle					
Create collaborative business networks					

PART B: STAKEHOLDERS PRESSURE

1. Below is a list of stakeholders' pressures. Using a Likert scale of 1-5 (where 1=No Extent, 5=Very High Extent), indicate the extent to which pressure from the following stakeholders influence adoption of green innovation in your firm. Tick as appropriate.

Customers pressure	**1**	**2**	**3**	**4**	**5**
Our esteemed customers needs us to improve environmental performance					
Our key clients needs us to be ISO 140001 certified					
Our key customers increasingly demand eco-friendly products					
Government pressure					
Government regulations in our industry that limit the use and emission of dangerous substances are stringent					
Government provides financial and technical incentives to implement green practices					
Employees pressure					
Our management and staff actively engage in green innovation activities					
Our management communicates green innovation information with staff					
Our management give environmental issues a high priority					
Supplier pressure					
Our key suppliers show concern for the environment and request the same from us					
Our key suppliers will decline to supply our company if our activities have an adverse effect on the environment					
Competitors pressure					
Firms in our industry spend a huge budget on Research and development to gain a competitive edge					
Competitors have increasingly implemented environmental practices					
Our competitors are marketing products as environmentally friendly					