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GREEN INNOVATION STRATEGIES, ORGANIZATIONAL COMPETENCIES AND FIRMS PERFORMANCE IN THE CONTEXT OF MANUFACTURING SECTOR: A THEORETICAL REVIEW

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ABSTRACT
There is a notable increase in an environmental awareness emanating from reaction to environmental degradation which has mounted pressure to organizations recognize green innovation as key pillar towards sustainable development and competitive advantage among firms. Green innovation has also gained undisputed interest among management scholars and business practitioners. Ecological crisis evidenced in manufacturing sector has prompted stricter environmental regulations to push firms towards going green. However for firms to transit well to green economy it calls for firms to possess competences which will help firms add value to available resources as well as mitigate environmental degradation. The existing theoretical and empirical literatures had been inconclusive on how they conceptualize green innovation and firm performance and role played by organizational competences and environmental regulations. This paper provided a review of the extant theoretical and empirical literature on green innovation strategies, organizational competences and firm performance in the manufacturing sector context. The relevant theories were cross examined, constructs and their operational indicators identified and compared against existing empirical work where emergent conceptual and theoretical knowledge gaps were identified. The paper finally proposed a multidisciplinary based theoretical model suitable for advancing knowledge in this area together with the accompanying implications for future research.

Key words: *Green innovation strategies, Organizational competences, Environment regulation, Firm performance, Manufacturing sector*

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INTRODUCTION

Green innovation has attracted an inexorable attention in the literature as a new emerging field of interest (Zubovskiy, 2015). Of late in most businesses, the focus has shifted from just meeting the demands of the market and profitability to addressing environmental issues by making environmentally friendly products (Tariyan, 2016). The genesis of green innovation is traced back in 1972 UN Stockholm Conference on Human Environment which addressed concept of sustainable development (Van Dieren et al., 1995). Dresner (2008) noted that from 1980 after release of world conservation strategy report that viewed sustainable development as the amalgamation of conservation and development to transform world in order to ensure survival and well-being of all of the people. The environmental awareness has increased in response to environmental degradation and global warming in most sectors (Wang, Chen, Lee, & Tsai, 2013). Harrison (2005) noted that since 1970s due to unsustainable use of natural resources and increased industrial activities, ecological crisis has escalated leading to pressure from public, environmentalist, media and policy makers to sky rot demand for environmentally friendly products (Qi, et al., 2010). This led to birth of the concept of green innovation.

Originally innovation was defined by Schumpeter (1934) as an activity entailing the development and introduction of a new product and service using new process and establishment of a new venture which is close to definition found in the Oslo manual (OECD, 2005). Kemp and Pearson (2007) deviated to include diffusion of technology. Schumpeter's viewpoint was noted to lack aspect of environmental conservation thus prompting later move towards green innovation. The definition of green innovation has been conceptualised differently (Carrillo-Hermosilla et al. 2010). Calza, Parmentola and Tutore, (2017) noted that green innovation is used indistinctly and interchangeably with words like eco-innovation, environmental innovation, eco-technologies and green technologies (Schiederig, Tietze & Herstatt, 2012). Ma, Hou and Xin (2017) clarified that green innovation can also be referred as environmental innovation or eco-innovation in literature which they defined as new or modified processes, techniques, systems and products to avoid or reduce environmental harm. Chen, Lai and Wen (2006, p. 534) defined green innovation "as hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management". Kemp and Pearson (2007) defined eco-innovation as production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives.

Green innovation relates to value chain addition. Kammerer (2009) noted that whenever product delivers added value to the customers, it promotes environmental innovations. Porter and Van Linde (1995) claimed that to create value the product and process need to address the green concern of market, industry, firm or customers. Tseng (2009) noted that green innovation is involved in each stage of supply chain in order to gain competitive advantage and decrease the environmental problems in the industry. Ma, Yin, Pan, Cui, Xin and Rao (2018) noted that green innovation helps to reduce the cost of firm and improve firm's competitiveness. Weng et al (2015) noted that improved consumer environmental awareness emanating from green innovation can augment corporate image which advance competitiveness in a firm. Ma, et al (2018) noted with green innovation, economic performance may

be realised through using recycled materials to manufacture products which can reduce cost and increase revenue when compared to the initial input of raw materials where recycled materials are relatively inexpensive. Green innovation also improves performance of a firm through waste reduction (Kleindorfer, Singhal & Wassenhove, 2005), shortening production time and costs (Lambertini & Mantovani, 2009), market position, affirms brand names, leapfrogs competition, creates breakthroughs, and attracts new customers (Mu, Peng & Maclachlan, 2009).

Manufacturing sector entails transforming input in to finished products and services that can be sold to the market. The sector involves processes that transform goods, materials or substances in to new products either physically, mechanically or chemically in order to add value on them (Levinson, 2018). Manufacturing sector needs incorporate aspects of green innovation practices to encompass shift and adjustment of strategies, manufacturing culture, product designing methods and resource consumption with aim of reducing stress on the natural environment and its resources (Conceicao et al., 2006). The environmental awareness needs an up-thrust effort. Recently, there is more awareness on environmental influence of manufacturing activities by media and consumers which call for behaviour change on issues of green innovation in manufacturing sector.

Statement of the problem

Environmental safety issues have taken centre stage among scholars in the field of management and business practitioners. Human health and ecological concerns have risen as environmental awareness and knowledge increase. Escalating public interest on environmental sustainability has raised concern on increasing ecological crises and environmental regulations on operations of businesses. Discussions on green innovation have ceaselessly continued for the last three decades with increase in industrial activities (Schiederig, Tietze & Herstatt, 2012) which have left the entire world at mercy of pollution and unmanaged waste disposal rendering it unsafe for human and animal habitation. Despite discussions on green innovation rooting three decades back, no succinct and conclusive argument have been reached (Salvado et al., 2014; Lin et al., 2011). The extant literature has not satisfactorily coined the constructs in question conclusively implying there is still lacuna that needs to be filled.

The existing conceptual literature on the green innovation strategies and firm performance is plenty but it is unclear and it portrays inconsistent conceptualization (Halila & Rundquist, 2011). Schiederig et al (2012) noted there is paradox on how green innovation is conceptualized. Some scholars use terms like eco-innovation, environmental innovation, eco-technologies and green technology interchangeably with green innovation while other studies claims they are different. The conceptualizations of dimensions of green innovation are different. Some scholars classify them in terms of focus, orientation, nature and scope (Damanpour & Evan, 1984; Ettlie & Reza, 1992) while OECD (2009) used strands like product, process, marketing and organisational innovations. Bansal (2005) noted that green innovation increases value of products; earning societal approval hence leading to superior firm performance although Blackman et al. (2010) claim it may not since going green come with cost.

Hitherto, some empirical studies have reported a gap in the relationship between green innovation and firm performance; most of them indicating positive relationship (Berrone, Fosfuri, Chen, 2008; Mantovani, 2006; Dangelico & Pontrandolfo, 2015). Other studies indicated negative relationship (Blackman et al., 2010; Filbeck & Gorman, 2004) while other showed no relationship (Salvadó, Castro & Navas-lópez, 2014; Heras-Saizarbitoria & Molina-

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Azorin, 2011; Rexhäuser & Rammer, 2014). Some studies have studied individual aspects of green innovation like green product innovation (Driessen et al., 2013; Albino et al., 2009) or green process innovation (Tseng et al., 2013) others only two concepts like combination of product and process innovation (Lee and Min, 2015). This calls for holistic study on green innovation and firm performance. The existing studies have been criticized for lacking theoretical objectivity and conceptual development (Aykol & Leonidou, 2014). Despite most studies having advanced the relationship between green innovation and firm performance; no known study have advanced the relationship when it is mediated by organisational competences and moderated by environmental regulation a gap which this study will try to close.

The existing literature was inadequate which called for need to come up with a new model which advance constructs of green innovation strategies, organizational competences, environmental regulations and firm performance in the context of manufacturing sector to fill the lacuna identified in the exiting literature and prompt direction for future studies. The main objective of this paper was to interrogate the current theoretical and empirical literature in order to clarify the link between green innovation strategies, organizational competences, environmental regulations and performance of firms in manufacturing sector context. Specific objectives achieved in this paper included: to examine the theoretical and empirical literature on the constructs of green innovation strategies, organizational competences, environmental regulations and firm performance in the context of manufacturing sector, to establish the emerging theoretical and empirical gaps that form the basis for succeeding studies and lastly to propose a theoretical model for filling the noticed gaps. This paper generated theoretical and conceptual repertoire of knowledge which connected green innovation strategies, organizational competences, environmental regulations and firm performance in manufacturing sector context. The knowledge bank was built on theoretical understanding of the construct of green innovation strategies and how they interplayed with firm's competences and environmental regulations to influence firm performance. The nature of knowledge build from this paper would be principal for utilization by practitioners and policy makers in the field of management particularly to in manufacturing sector which has a lot of environmental concerns unaddressed. The paper came up with proposal of a theoretical model that was considered relevant for usage in guiding forthcoming inquiries.

REVIEW OF LITERATURE

Green Innovation strategies

The enthusiasm to pursue agenda on green innovation has escalated among researchers (Lopez-Valeiras et al., 2015) and policy makers (OECD, 2010) and how it connects with holistic and sustainable firm performance. Green innovation is a concept that has been conceptualized and defined variedly by diverse scholars in different disciplines (Halila & Rundquist, 2011). Schiederig et al (2012) cited in Calza, et al (2017) agreed that green innovation is used indistinguishably and interchangeably with words like eco-innovation, environmental innovation, eco-technologies and green technologies which is closely associated with corporate environmental management and eco-target achievement. Carrillo-Hermosilla et al., (2010) consents that defining green innovation is an uphill task despite bulk of literature making attempts where it is seen as sub set of innovation (Rennings, 2000; OECD, 2009) leading to ecological equality and toward sustainable development.

Ryszko (2016) conceptualized green innovation as eco-innovation which was defined as the production, assimilation or exploitation of a product, production process, service, management or business method

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that is novel to the organization (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives. OECD's (2009: 40) refined the conceptual definition of eco-innovation as "the creation or implementation of new, or significantly improved, products (goods and services), processes, marketing methods, organisational structures and institutional arrangements which (with or without intent) lead to environmental improvements compared to relevant alternatives". Yang and Yang (2015) green innovation which they refer as eco innovation to have three distinctive features of being *universal* to encompass any type of innovation which considers sustainability, *effectively* being environmentally friendly (Horbach et al., 2012) and *relativity* by innovation activities being able to improve the environmental performance of users.

Green innovation in a production set up help improve overall quality of life by improving efficiency and having environmentally productive products (Marcus & Fremeth, 2009). Whenever products are perceived to be valuable by consumers and have good environmental initiatives (preventive pollution, saving operating costs and reuse materials through recycling) it acquire better ecological reputation (Christmann, 2000) and greater social approval (Bansal, 2005) which earn them credit in terms of differentiation with products of their competitors. Eco-innovation should deliver lower consumption of natural resources, new sustainable energy generation methods and new eco-operating practices and products (DECC, 2010). Carrillo-Hermosilla et al. (2010) call for training of staff on environmental concerns like; environmental communications in product packaging, secondly, funding environmental activities in society and utilizing reprocessed material in packaging products sold (Martin et al., 2013). Linder et al. (2003) asserted that an innovation must create value. They conceptualised value creation by cross checking product or process innovation where there is establishment of new product or process which leads to higher margins, greater revenue, enhanced stakeholder value, greater market share, better corporate image or improved performance in terms of "greenness". Green innovation can be catalysed by responding to environmental requirement by consumer or corporate environmentalist (Chen, 2011), zeal to achieve higher profits and cost efficiency emanating from going green (Rennings & Rammer, 2009) and thirdly creation of value through being efficient, productive and product market performance through addressing 'greenness' concern of market, industry, firm or individuals.

Organizational competences

The concept of organisational competences have been conceptualised in different by many scholars with some converging arguments denotes that they led to sustained competitive advantage (Hafeez et al., 2002). According to Hafeez et al (2002) core competency are capabilities that differentiate firms from others in the same environment. Sanchez and Heene (1997) notes that core competencies results from 'collective learning' processes and are demonstrated when coordinating various production skills and technologies. They are unique capabilities which cut across variety of products and market (Hafeez et al., 2002). Gupta et al. (2009) noted that core competence is communication, involvement, and a deep commitment to working across organizational boundaries. Krasnikov and Jayachandran (2008) claim competences to be synonym of capability which is the ability of the organization to improve business process making it effective and efficient with minimum wastage of resources. Capabilities help firms take their undertakings by supporting the existing products and services to the customers in terms of cost reduction,

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speed and quality and are associated with firm (Helfat & Winter, 2011).

Most scholars have conceptualised core competences in to three core perspectives namely: shared vision, cooperation, and empowerment (Hafeez et al., 2002; King & Zeithaml, 2003). Shared vision is defined as a firm's interest in sharing the organization's view of goals, objectives, policies, priorities, and expectations. When firms have shared vision, they are likely to succeed as it enhance learning; leading to building of innovative products and services which meet demands of customer and market (Ussahawanitchakit, 2012). Shared vision entails discussions, diagnoses and analyses among employees regarding various trade-offs facing the organization (Slater & Narver, 1995). The existence of shared vision regarding green issues within an organization has a positive impact on the development of sound environmental strategies (Aragón-Correa et al. 2008). Shared vision is an element derived from culture of the firm which help develop sustainable business model for green organization. For business to be efficient and effective in going green it require to synchronize its business functions across all its functions without being role of a sole department (Aragón-Correa et al. 2008). Cooperation on the other hand is important in the development of core competence. Cooperation is a joint behaviour toward a particular goal of common interest that involves interpersonal relationships (Croteau et al., 2001).

Environmental regulations

Environmental regulations entail set of laws, rules, and regulations that govern a wide range of issues, such as clean technologies, green technical standards, and package recycling (Banerjee et al., 2003). Later, Eiadat et al. (2008) defined environmental regulations as a set of characteristics for government environmental policies aimed at mitigating a firm's impact on the natural environment and creating a context where a firm will engage in environmental innovations. Eiadat et al (2008) claimed that regulations are a form of governance structure, usually combining elements from the extremes of market and hierarchy. The market mode is characterized by high-powered incentives with little administrative control, while the hierarchy combines low-powered incentives and excessive administrative control. Regulations could be considered as a hybrid structure combining elements of market and hierarchy. Environmental economics indicates that to make any strides towards green innovation; regulatory stakeholders are core. Porter and Van der Linde (1995) claimed in what is referred as 'Porters hypothesis –The win-win scenario' that well modelled environmental standards can influence innovations which are associated with cost of products and increased value.

The world with advent of technology has become a global village. Most countries are now signatories to strict international environmental regulations and conventions of environmental protection coupled with advanced environmental awareness of consumers on 'going green' (Chen et al., 2006). They have set standards on specification for product "greenness" through treaties, regulations, practices, and guidelines. The standard vary in some countries as they address specific ecological needs but generally the ecological and human health, social, cultural and economic impacts of a product is the major concern (Lai et al., 2012). Strategy employed need to be well understood by stakeholders so that they may receptive to them. (Oltra & Jean, 2009). The products need to give fewer burden on the environment (Chuang & Yang, 2014).

Firm performance

The construct of firm performance is broadly conceptualised differently in different disciplines and widely used in strategic management as ultimate or independent variable (Richard et al., 2009). Traditionally performance was gauged using financial

metrics like Return on Assets (ROA), sales, profit and stock returns which was quantitative in nature and due to displeasure with this approach; Kaplan and Norton (1992) came up with Balanced Score Card (BSC) which incorporated non-financial aspects. Santos and Brito (2012) recommend to use growth, profitability and market value in operationalizing financial performance while using employees' satisfaction, social, environmental, innovation, learning and internal process to represent non-financial performance. Hubbard (2009) improved BSC to Sustainable Balanced Score Card (SBSC) with aspects like financial, customer, internal business, learning, social and environmental performances. Performance has further been operationalized to cover other intangible aspects like public image perception, customer satisfaction, employee satisfaction, attrition and skills levels, innovations in products and services, and investments into training of new value streams (Fullerton & Wempe, 2009). It is however noted non-financial performance measurement may be subjective and dependent on human cognition (Ketokivi & Schroeder, 2004).This has made performance measurement complex and inconclusive thus making debate on performance still open, indistinct and imprecise in the field of strategic management prompting further inquiry (Richard et al., 2009).

To address organisation performance in relations to green innovation, performance is conceptualized in four dimensions namely: financial performance, environmental performance, operational performance and environmental management behaviour. For firms going green, financial performance gauged in terms of elimination of the pollution, and reusing of waste materials where they offer opportunity to cut cost and in end increase profit (Hart, 1997). Revenue is increased by selling pollution-control technology, gaining access to certain market and differentiating product (Ambec & Lanoie, 2008). Environmental performance on other hand will involve capacity of manufacturing firms to reduce air emissions, effluent waste, solid waste, environmental accidents and reduce consumption of hazardous, and toxic materials while improving in an enterprises' environmental situation (Zhu et al., 2008). Operational performance is realised when manufacturing plants is able to produce and deliver products to customers more efficiently and in a timely manner while reducing inventory levels, scrape rate and improving product quality and line, and its utilization capacity (Zhu et al., 2008).

Manufacturing Sector Construct

Manufacturing is process of transforming of materials or components in to finished products that can be sold in the market place. The transformation process can be physical, chemical or even mechanical (Levinson, 2018). Manufacturing sector creates physical goods for public consumptions using machines and equipment which vary from one firm/industry to another. They tend to create value and as goods are being produced in mass, the prices go down unlike when goods were made using hand (Levinson, 2018). Nowadays, with advancement of technology efficiency has improved leading to cost effectiveness. However, the automation has been noted to have come with price of joblessness (Levinson, 2018).

Manufacturing sector is heavily connected with soaring of innovation. Beyene1, Shi1 and Wu (2016) noted that manufacturing firms of different size are nowadays operating under highly uncertain and dynamic market conditions. Such market conditions along with the turbulence of technology are forcing manufacturing firms to look for alternative way of survival and growth. Innovation has taken a centre stage where they transform their processes and product so long as they will become source of competitive advantage. Innovation is seen as an avenue of value creation with which the trending preference of green products. Firms have been pushed to change and adopt new practices which will

improve firm performance particularly in incidences of scarce resource, dynamic business environment, steep competition and changes in customer demands for quality products (Roberts & Amit, 2003). Beyenel et al (2016) noted that competition intensity and change in customer's taste and preference has relegated firms to initiate new products at faster rates and lower costs.

Conceptual issues

From the literature review done so far, it is clearly evident that the authors cited in the literature have made creditable efforts in describing the green innovation, organizational competences and firm performance in context of manufacturing sector with contingency effect of environmental regulations. Most scholars have closely scrutinized how key construct have been operationalized and applied in practice in the field of strategic management by conveying clearer understanding of the constructs. The scholars have had convergence and nonconformities on the reasoning of how the constructs should be conceptualized and operationalized. First it is flawless to note that most studies agreed that green innovation can be conceptualized as green product innovation, green process innovation, green marketing innovation and green organizational innovation (OECD, 2009). Organizational core competences are widely conceptualized as capabilities that differentiate firms from others in the same environment which this paper has conceptualized in terms of firm's culture like: unique resources, managerial intellectual capability and firm cultures cross cutting aspects like shared vision and values. Environmental regulations are conceptualized in terms of environmental policy, environmental management systems, clean technologies regulation and green technical standards. Performance is conceptualized in both financial and non-financial metrics and advanced to cover environmental aspects.

Secondly, the literature has deviated in some aspects of arguments. It is noted most scholars operationalized the dimensions of green innovation diversely depending on the context and the sector of the economy where the study is done to suit their study. Despite general view that green innovation influence performance positively scholar like Blackman et al. (2010) notes that innovation has cost which affect performance of the firm negatively. Despite agreement that organizational competences like resources influence success of firm, there is claim that unique resources alone can't influence superior performance in the firm (Gupta et al., 2009). Performance is fashionably conceptualized in various studies calling for a standardized way to define performance.

The state literature on conceptual issues provides enormous literature. To sightsee how the constructs can be understood in practical nature, various empirical advancements have been made by a bunch of empirical studies indicating how diversely roles played by various key constructs. For instance: Tang, Walsh, Lerner, Fitza and Li (2018) established link between green innovation, and firm performance when mediated by managerial concern, Ma et al (2018) studied on green product innovation and firm performance: assessing the moderating effect of novelty-centered and efficiency-centered business model design, Calza et al (2017) investigated on types of green innovations and ways of implementation in a non-green industry, Alsughayir (2017) investigated whether green product innovation affect performance of Saudi chemical industrial firms, Wakeford et al (2017) studied innovation for green industrialization with assessment on cement, leather and textile sector, Ma et al (2017) investigated green process innovation and innovation benefit with firm image playing a mediating role, Zubovskiy(2015) investigated transferability of green innovation practices to the customer. The study showed connection between green innovation and firm

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performance mostly in industrial setup which is related with manufacturing sector.

It is noted that there are clear attempts by scholars to succinctly clarify the relationship between key constructs of interest. However, the descriptions have failed to provide theoretical underpinnings to anchor their study on. This observation is notably crucial as new pieces of knowledge need to be compared against the existing theoretical models in order to provide direction on how the constructs in particular discipline need to be undertaken. In connection with various studies, researchers propose need for using broad spectrum of theories to aid in a holistic conceptualization and theorization of the linkage among constructs under investigation. In manufacturing sector set up, the constructs of green innovation and firm performance are influenced by organizational competences and environmental regulations that emanate from several theories which create the basis for developing a theoretical framework.

Review of Relevant Theories

Green business model innovation perspective

The model was proposed by Bisgaard, Henriksen & Bjerre (2012). Its key emphasis is on sustainable use of resources so that future generation may not be exposed to resource scarcity emanating from environmental risks worse than previous generations. It tends to clarify on how firms make their business green and extends of qualifying to be green organisations. It is based on tenets that when new model of sustainability is being brought forth, it needs to recognize innovation as key ingredient for a firm to be competitive as they develop new products and services (green tech and clean tech) or alter business model (Bisgaard et al, 2012). The shift made by firm's operations are the green business model innovations where innovation may prompt firms to substitute to greener inputs, reusing, recycling resources to come up with greener products, services and processes. Firms need to think through different component of the business in order to challenge the existing operation model and create new strategic alternative. Major elements to be looked through include: customers, offering, infrastructure and financial viability. The changes done by firms revolve around modification, re-designing alternatives and to create value as the firms adopt green business model (Osterwalder & Pigneur, 2010). Bisgaard et al (2012) conceptualize green business model innovation in to two perspective that is incentive models and life-cycle models. The incentive models include functional sales or product service systems and performance-based models which may have green effects like energy saving, raw material saving. The life-cycle models encompass cradle to cradle, take back management, green supply chain management, and industrial symbiosis. Key propellers for green consumer awareness, firm's agenda, quest for competitive advantage and increased cost of inventory. It is however noted that green business doesn't come with ease as it is limited by lack of knowledge in entire value chain and large cost associated with going green (Blackman et al., 2010).

Green business model innovation has credit associated with it which encompasses: creating positive environmental impacts for more innovation and financial benefit, the transformation in the processes resulting to new products and services that are greener and environmental sustainability which in the long run lead to reduction in raw materials use, energy consumption, water consumption, GHG emissions, toxic chemicals and waste reduction (Bisgaard et al, 2012). The perspective advocates for establishment of policy guidelines which will enhance green growth and business to succeed in going green. Policy aid in initiating regulations that govern green business not only locally but globally. The call for culture of dialogue between regulatory authorities and private investors which brings cohesion and proper understanding of challenges in order to offer

solution (OECD, 2012). Green business model innovation with focus on incentive model is noted to be coupled with various challenges ranging from large investment tied to green product, long payback time for customers, lack of flexibility in the contracts, uncertainty about savings achieved by customers, traditional mindset among customers and employees, and difficulties in involving other companies in the value-chain (FORA, 2009). The incentive model can be enhanced through: encouraging an efficient public sector, increase customer flexibility in long-term contracts and adopting sustainable sstandards. On other hand, to promote lifecycle model it is recommended that firms should embrace green public procurement, establish infrastructure for recycling and standardize criterion for going green and to support R&D.

Resource Based View (RBV) Theory

The theory was coined by Penrose (1959) and advanced further by Barney in 1991. The postulates of the theory emphasize on the pivotal role played by organization's resources and capabilities for firm to attain competitive advantage and superior performance. Barney (1991) observed that firm performance is realised when resources and capabilities are pooled together as they work concomitantly. Resources are input to the capabilities while capabilities utilize resources to attain desired outcomes. Grant (1991) categorize resources as tangible, intangible, and personnel-based. Tangible resources are as infrastructure, equipment, raw materials and financial reserves. Intangible resources include knowhow, reputation and technology while personnel-based resources include: culture, training, commitment, loyalty and knowledge. Barney (1991) posits that firm resources and capabilities need to be unique by being rare, valuable, market imperfect where there is barriers to acquisition, imitation, and substitution of key resources or inputs. The differentiation emanating from distinctiveness of resources led to competitive advantage over competitors.

Barney (1991) notes that organizations contain bundles of strategic (e.g., green technology) and operational (e.g., individual skills on green issues) resources that they can apply in differing amounts and intensity to various specific business situations. Organizational capabilities are processes (e.g., new green product development) by which resources are deployed, transformed, integrated and managed to offer values of strategic intent (Morgan, Katsikeas, and Vorhies 2012). These capabilities are essential in activating the firm's resources to perform their function, update their status, and even nurture their very existence (Teece, Pisano, and Shuen 1997). Critics of RBV noted that the sustainability of competitive advantage tend to shrink off due to turbulence in market conditions like change of consumptions patterns, preferences and taste; abrupt change of industry structure like new entrants o the market which relegate firm to losing their competitiveness (Teece et al, 1997). This implies that RBV doesn't take in to account dynamism in the market. The relevance of RBV in green innovation context is that while addressing environmental issues there is need to use of heterogeneous resources and idiosyncratic capabilities to achieve a competitive advantage (which is derived from the adoption of eco-friendly practices) and enhance company performance.

Organizational identity theory

The proponent of organizational identity theory was Albert and Whetten (1985). Organisation identity was conceptualized as firm's collective framework which influence action of all employees. It entails coming up with core values and beliefs that direct organisations (Albert and Whetten, 1985). When firms incorporates aspects of environmental concerns, its members develops sense of environmental responsibility which results to green organisation identity. The concept of green organisation identity was further coined by

Chen (2011) where it was conceptualized as an interpretive scheme of a firm's environmental management and protection that the organization's members collectively construct to provide meaning for their behavior. This implies that if organisations are to be engaged on activities involving serious environmental pollution due to budding industrial activities, an organizational green innovation strategy will help improve business models and change management attitudes toward creating a green organizational identity which is subsequently associated with green innovation (Chen, 2011).

Hart (1997) connected green innovation strategy with green organisation identity where it was noted that strategy will thrill environmental awareness of pollution prevention, product stewardship and clean technology which address environmental sustainability challenges.When an organization with a strong sense of green organizational identity is faced with external pressure to address environment issues, creative responses to that pressure may produce novel and useful ideas, which further stimulate the organization's capability for green creativity (Chen, 2011; Chen and Chang, 2013). The novel and useful green ideas may contribute to green innovation. Green organizational identity can stimulate adoption of environmental management to promote its green images as a responsible green organization (Chen & Chang, 2013). The relevance of this theory to this study is that managers need to make the organization's employees realize that their organization is ready to invest great efforts in green innovation and be identified as organisation that has gone green. This requires setting up a green firm culture, values, rules and green environmental awareness that will make firm maintain that green reputation and brand.

Institutional Theory

The theory was proposed by Scott (1995). The theory anchor on the deeper and more resilient aspect of social structure. It considers process by which structures like schemas, rules, norms and routines become established as authoritative guidelines for social behaviours. Scott (1995) defines institutions as cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. The theory accentuate that firms replicate the behavioral norms of other actors in the organization's field of operation to survive in the business. The theory concentrates on the relationship between institutions and their contextual operating environments. To the context of this study, manufacturing sector is operating in environment that demands for environmental consciousness and in process of reacting to market and institutional pressure it has prompted move towards green innovation (Greenwood & Hinnin, 1996).

Institutional theory is built on pillar that to realise sustainable competitive advantage, firm rules, norms and belief need to be socially acceptable and responsible which can be inspired by socially responsible cultural institutions that create incentives for such behavior (Oliver, 1997). Culture of an industry determine the overall profile of industry in areas like public visibility and degree of scrutiny emanating from government, public and the competitive structure of the industry. R&D activities are supported when firm acquire legitimacy by addressing stakeholder needs that call for green innovation to reap the benefits of proactive social action (Quazi and O'Brien, 2000). The theory is relevant to this study in that due pressure from many consumers and regulatory institutions in going green; many organisation have readjusted their system and process to going green and having green products as markets demands. With augmented quest by many organisation to move towards sustainable competitive advantage in this manufacturing era, all organisation have reconfigured their organisation to adopt a culture that will propel organisation towards green innovation.

Contingency Theory

Contingency theory was advanced by Fiedler (1967). The theory postulates that there is no best way to organize, lead or make decision in a firm but it is dependent on internal and external situations. It alluded that firm stray from one another due to environmental demands and external condition of the firm. These condition are referred as contingent factors which include: environment, technology, age and size. The theory holds that performance of firm is a function of the congruence between an organization and its environment, strategy, and structure (Lawrence and Lorsch, 1967; Venkatraman and Ramunjan, 1986). The organizations need to reconfigure their structures and strategies such that they maintain fit with changing contextual factors. Miles and Snow (1978) contents that match of strategy with their environmental context promote firm performance while mismatch equates to slow retorting to change and adverse performance. With advent of industrialization, there is shift of focus to address mounting environmental pressures from different stakeholder groups which is up-hill task to achieve (Delmas & Toffel, 2008).

Firms should be in position to use their capabilities to respond to volatile market demands and environmental concerns so that it may have edge over their competitors. The market is dynamic; pigeon-holed with government environmental regulation and stakeholder's pressures which have prompted need for every firm to develop environmental innovation strategy (Delmas & Toffel, 2008). The relevance of this theory is that green innovation is dependent on the both internal (values, knowledge, norms) factors and external factor (government regulations) for firm to transform to green and perform optimally in the market.

Stakeholders Theory

The theory was originally coined by Ansoff (1965) and later improved by Freeman in 1984. The theory postulates that the interests of stakeholders of a firm are paramount for firm to realise optimal performance. Freeman (1984) clarifies that stakeholders are individuals acting individually or collectively as a group whose actions can affect or influence firm's objectives. Stake holders of a firm range from employees, creditors, suppliers, public interest groups, customers and even government agencies. Freeman claims that government as key stakeholder holds colossal influence that impacts on firm performance through its regulations. Robins (2008) observed that when there is healthy relationship between organisation and its stakeholders, it lead to better performance of an organisation. Leaders in an organisation need to align their views with organisations' objectives for maximum returns (Freeman, 1984). However, the theory is found short of succinctly clarifying the real stakeholders of the firms and how to handle the myriad and conflicting interests (Nesvadbora, 2010). The theory is relevant since the environmental regulation and stakeholders may act as external push and imposed drivers of green innovation which impact indistinctly on companies subjected to certain norms or stakeholder pressure.

THEORETICAL ISSUES

To clarify on the linkage between green innovation and performance of firms operating in context of manufacturing sector; review of relevant theories relating to the key construct was done which demonstrated there are existing theories connecting the key constructs. For instance, green business model innovation accentuated how green innovation strategies are pivotal in influencing firm performance, while RBV recognizes firm's resources like personnel and firm culture are key in influencing green innovation hence leading to firm performance. The organizational identity theory clarify how when firms associate themselves with going green influence firm performance. Contingency theory try to address how both internal and external factors influence ability of

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firms going green. This address aspects related to environmental regulation governing firms going green. This is in tandem with what is addressed by institutional theory which address aspects related to laws, culture and regulations governing firms going green. In close range stakeholders theory connotes that there should be a balance stakeholder's desire for environmental conservation as firm move towards going green.

There are notable areas of convergence and divergence from the postulates of theories anchored to this study on how various perspectives of green innovation, organizational competences and firm performance interplay in the field of strategic management. Green business model and organization identity theory recognize the role of green innovation in influencing organizational competences and firm performance. RBV and organizational identity theory draw close that competences are key for firms going green and maintaining of their competitiveness while stakeholders and institutional theory recognizes how interest of key actors and regulations are pivotal for firms going green. Divergence is noted where its only green innovation model that goes deeper to cluster green innovation in to various dimensions while other theories conceptualize green innovation as a block. Most of the theories complement each other for instance most of the theories agree that green innovation in the era of environmental degradation are key constituent to firm performance. The stakeholder's theory and institutional theory complement each other in that they address how regulations and interest of the key plays influence firm performance. This means it needs all theories to need to fused together in this study in order to address all construct under investigation comprehensively.

The theories used in this study have been applied in several empirical studies to provide theoretical grounding for various constructs and view how the theories apply practically in research. For instance, Chen (2015) used institution theory and stakeholder's theory to study on sustainability and company performance: evidence from the manufacturing industry in Sweden. Study by Yu, Ramanathan and Nath (2016) in their study on environmental pressure and performance with environmental innovation strategy as mediation and marketing capability as moderator used contingency theory as the main theory. Song and Yu (2018) study on green innovation strategy and green innovation used green organizational identity as the main theory in the study, Leonidou et al (2013) widely used RBV theory to clarify antecedents and consequences of an eco-friendly export marketing strategy with the moderating role of foreign public concern and competitive intensity, Sambu (2016) anchored study on RBV theory and institutional theory to study effect of green packaging on business performance in Kenya. The tenets of green business model innovation by Bisgaard, Henriksen & Bjerre(2012) are applied in most studies relating to green innovation as it address issues of sustainable use of resources a key components for firms going green.

The reviewed theories indicated that there are linkages between constructs used in this study which are key ingredient in guiding development of a theoretical model. For instance, green business model, organizational identity theory recognize the role of green innovation on firm performance. Institutional theory, stakeholder's theory and contingency theory expound on the role of environment and environmental regulations in influencing nature of green innovation and performance of a firm. The RBV, organizational identity theory recognize the role of organizational resources and competences in influencing green innovation and competitiveness of the firm. However from the theoretical review, no single theory was found to be sufficient to tie the constructs of green innovation strategies, organizational competences and firm performance although the constructs were

noted to work concomitantly, hence need for single theory to comprehensively address this gap as well as guide future empirical work in strategic management.

The Call for a Theoretical Model

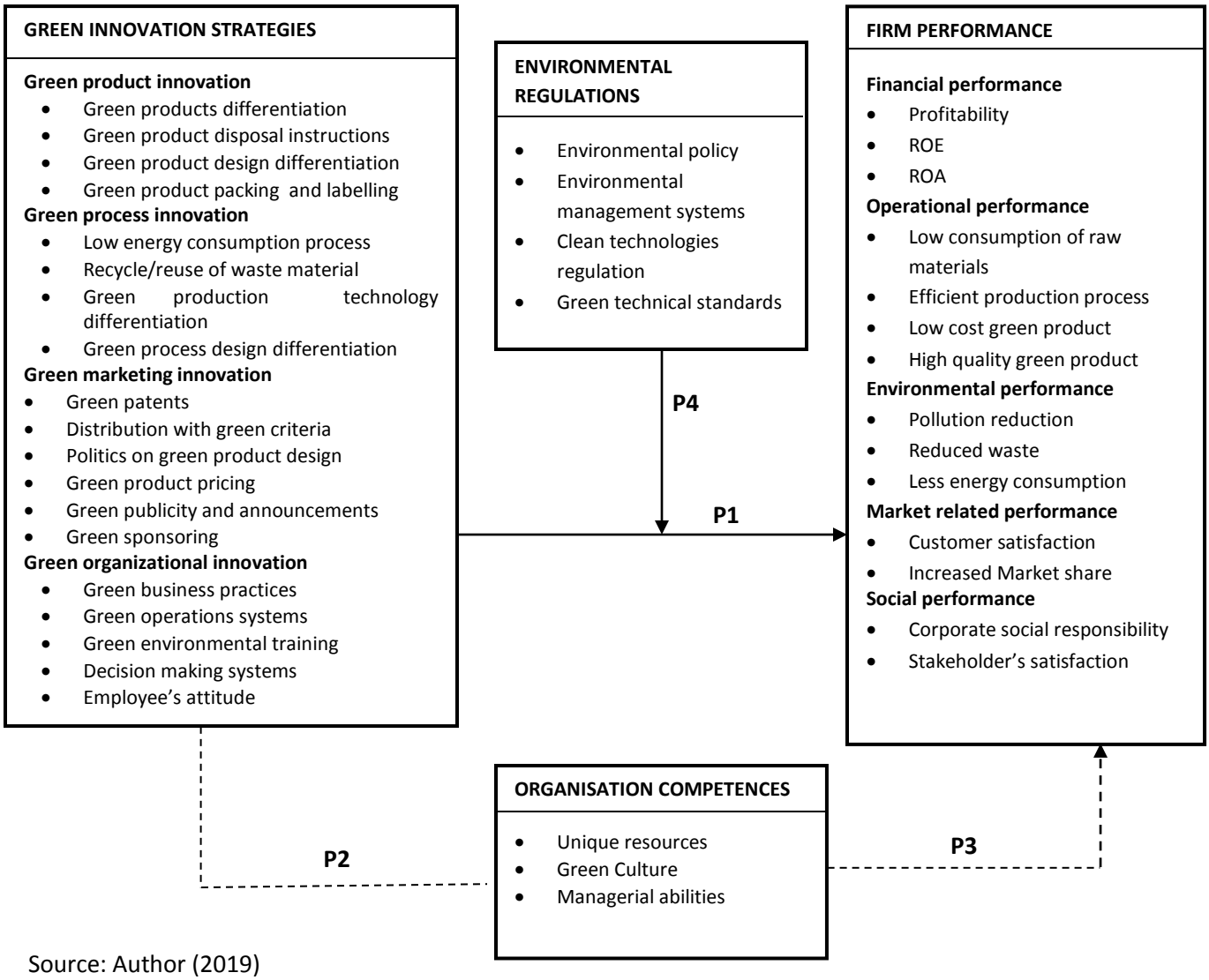
The reviewed conceptual, theoretical and empirical literature wide-opened the relationship that exit between the key constructs of this study. Specifically, the study constructs were: green innovation strategies, organizational competences, environmental regulations and firm performance in the context of manufacturing sector. The existing literature had notable gaps on how the key constructs have been conceptualized. From theoretical review, it was noted there was no single theory which was grounded to address all the key constructs in this study indicating a gap which need to be closed. The empirical studies indicated inconsistency, inarticulate and inconclusive results on the relationship between the relationship between green innovation, organizational competences, environmental regulations and firm performance. The existing models have fell short of linking the key constructs in one study. For instance, the most notable green business model innovation by Bisgaard et al (2012) link green innovation practices and strategies and firm performance where it hasn't infused the organizational competences and environmental regulations which to the proposed model will play role of an intermediate factor and contingent factors respectively. Most existing studies have also failed to address all aspects of green innovation in a single study calling for holistic approach which this proposed model will try to offer. This implies that the quest prompting unrelenting search on the constructs isn't exhausted convincingly thus need to propose a theoretical model to guide study on the main constructs of this study so that as succeeding studies may put in to consideration bringing the constructs in one study and even borrow some constructs in other discipline in one study.

To advance new knowledge on green innovation strategies, organizational competences and firm performance in the context of manufacturing sector, a theoretical framework is very paramount. From an ontological and epistemological perspectives, theoretical framework aid in backing up theories in the study and clarifies on the theory that expounds whether the constructs being explored exists. It should further define the link that exist between various constructs under inquiry and clarifies how they work. (Nachmias & Nachmias, 2009). In order to address the absurdities that exist on the current knowledge, it call for theoretical framework so that a succinct assessment of assumptions may done in a critical manner leading to the hidden answers. This yields to description of phenomenon in more intellectual way thus generalizing the phenomenon to other related phenomenon. Since the existing arguments fails to invalidate the role of theory in a research and its contribution in conceptualization and hypothesizing, it is necessary for this paper to propose a theoretical model for guiding future studies in strategic management on the key constructs under investigation.

The Proposed Theoretical Framework

This paper presented set of arguments on several constructs that emerged from both the theoretical and empirical literature review. The constructs of this study were green innovation, organizational competences, environmental regulations and firm performance in context of manufacturing sector. To clarify, understand and develop a piece of knowledge in the projected way, a model plays a pivotal role. The model presents green innovation strategies as an antecedent factor where it is conceptualized in terms of green product innovation, green process innovation, green marketing innovation and green organizational innovation. The intermediate factor emerging from green innovation strategies is organizational competences which has dimensions like organizational unique resources, culture,

managerial abilities and firm's green image. The contingent factor is environmental regulations which has dimensions like: environmental policy, environmental management systems, clean technologies regulation and green technical standards. The ultimate factors which is firm performance has been conceptualized using through financial measures, operational performance, environmental performance market related measures and social measures.



Source: Author (2019)

Figure 1: Theoretical framework linking green innovation strategies, organisation competences and firm performance with contingency effect of environmental regulation

Green innovation strategies and firm performance

Green innovation strategies are key in influencing firm performance of firms. Due to increased unsustainable use of natural resources and industrial activities, ecological crisis has escalated leading to pressure from public, environmentalist, media and policy makers to increase demand for environmentally friendly products (Qi, et al., 2010). Green innovation is used indistinctly and interchangeably with words like eco-innovation,

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environmental innovation, eco-technologies and green technologies and new or modified processes, techniques, systems and products to avoid or reduce environmental harm (Calza et al, 2017). Green innovations is divided to four main subsets which include: product, process, marketing and organizational innovation (OECD, 2009). Green innovation relates to value chain addition which have to address the green concern of market, industry, firm or customers (Kammerer, 2009). Since firms face challenges of resource limitation, varying consumer preferences, societal pressures and regulatory policies there is need to strike a balance between firm economic growth and environmental sustainability. The available theoretical and empirical literature supports a relationship between green innovation strategies and firm performance. It is therefore logical to conclude that for firms in manufacturing sector context, employment of green innovation strategies will led to superior performance of firms. Thus, the paper proposes that:

Proposition 1*: Firms which have incorporated green innovation strategies will realise high level of performance in the context of manufacturing sector.*

The Role of organizational competences

Organizational competences are the ability of the organization to improve business process making it effective and efficient with minimum wastage of resources (Krasnikov & Jayachandran, 2008). They differentiate one firm from other in the same environment (Leonard-Barton, 2000). To succeed in green innovation, acquisition of unique resources and competences is keyin order to realise competitive advantage (Calza et al, 2017). The moves for organisation in going green require strong firm culture towards going green (Gürlek & Tuna, 2018). Culture will shape environmental practise and issues (Howard-Grenville & Bertels, 2012). Beliefs, values and norms shape the standard behaviours expected from the individuals in going green (Chen, 2011). Human capital is noted to be competence in going green which entails knowledge and skills of individuals in an organization. Knowledge and skills are genesis of the competences embedded in the employees (Inkinen, 2015). It is evidence in the argument that organization competences have a hand on the firms going green and firm performance. Thus the study proposes that:

Proposition 2: Firms that have adopted green innovation strategies in the context of manufacturing sector and are conscious of their context will influence the nature of organizational competences that the firm will hold towards going green by a firm.

Proposition 3: Although green innovation strategies in the context of manufacturing sector have been proposed to influence performance, the strength of the influence is based on the intermediate state of the organizational competences a firm possesses.

The Role of environmental regulations

Environmental regulation entails sets of laws, rules, and regulations that govern a wide range of issues, such as clean technologies, green technical standards, and package recycling (Banerjee et al., 2003). They extent to government environmental policies mitigating effects on the natural environment (Eiadat et al, 2008). Environmental protection policy is the main driver of green innovation leading to competitive advantage (Ma et al, 2017). It is however noted that if there is no balance between stringent regulations it will affect firm's greenness and economic performance either positively or negatively (Eiadat et al., 2008) especially when there is pressure to be environmentally responsible. Call for multidisciplinary, elaborate, multidimensional and inter-linked streams of initiatives to manage balance between stringent regulation and firms going green is noted to be key. There is need for a win to win situation where firm gain competitive advantage and keep environment fit (Porter, 1991). Environmental regulations and designs which are flexible to the changing needs in the environment tend to have

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better results than strict and inflexible regulation (Partzsch, 2009). This call for succeeding research to dig deep and clarify the paradox by using multi-dimension approach in qualifying whether the relationship exist between green innovation and firm performance and role played by environmental regulation.

Thus, the study proposed that:

Proposition 4: Even though green innovation strategies of firms in manufacturing sector context is likely to influence their performance, the level of performance attained is contingent upon the state of environmental regulations

Conclusion and Direction for Future Research

This paper evaluated the linkage between green innovation, organizational competences, and firm performance in context of manufacturing sector with environmental regulations as the contingency factors. The literature reviewed expounded the main indicators of the key constructs, how they link with theoretical pieces of work and how they can be applied in strategic management and in practice generally. While going through the massive theoretical and empirical literature, various gaps were identified and how the key constructs interplayed amongst them. To fill the identified gaps, this paper has proposed a theoretical model with accompanying propositions which will help address the identified gaps.

Literature review done in this paper clarified the current state of knowledge relating to green innovation strategies and how it link to firm performance. The paper indeed has shown green innovation strategies cannot single handedly lead to firm performance but it incorporates the intermediate role of organizational competences in the relationship with environmental regulations playing a contingency role in the relationship. To explicitly explain the relationship between the constructs, it calls for a multidisciplinary literature to clarify the relationships between green innovation, organizational competences, and firm performance in context of manufacturing sector. This study has extended wings to incorporate environmental regulations as a contingency factor which hitherto studies have been deficient in. The study further noted that most previous empirical studies have focused on a unitary view of dimension of green innovation strategies. This is a lacuna this study will fill by having holistic and integrated view of green innovation strategies where their level of significance to firm performance can be compared. The study also noted a gap on the intermediate role of organizational competences where most empirical studies swigged around varied mediating variable rather than organizational competences. Variance was noted on reviewed study findings where mediating factor was different on the relationship between green innovation strategies and firm performance thus need for study tying the three variables. There is weakness on how firm performance is operationalized where most studies measured it in a very subjective manner having clear metrics to which is measurable. The study proposes use of holistic measure of financial and nonfinancial performance. In terms of methodology, most empirical studies used survey or cross sectional research design which was noted to be limited in terms of time to capture the trends that happen during firms going green calling for a longitudinal research design. This study proposes an empirical study to be done in firms in manufacturing sector especially in food processing industries and beauty products industries which have products that are consumed directly by human.

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