

*Review*

# **The antecedents of innovativeness in small and medium manufacturing enterprises in Kenya: A critical review of literature**

**Mkalama B. W.\*, Ndemo B. E. and Maalu J. K.**

Department of Business Administration, School of Business, University of Nairobi, Kenya.

Received 24 July, 2018; Accepted 3 September, 2018

**Innovation has been accepted as a key stimulus for growth. This is more so with SMEs which are widely acknowledged as being a significant driver in economic growth. In a review of over 90 peer reviewed journal articles and conference papers; this paper brings together different arguments that have been made in explaining the antecedents for innovativeness. This is a critical review of the literature with respect to innovativeness of manufacturing SMEs. Whereas it is acknowledged that the discussions around innovation are continually evolving, existing literature has shown that there are internal and external factors that affect innovativeness in firms. In addition to this, there is a need to have research that applies universally and hence the need to study this phenomenon in manufacturing SMEs in Kenya and the gaps therein. Even though entrepreneurial orientation, technological capability and environmental dynamism have been identified as variables affecting firm innovativeness, there is no common consensus across various approaches. A need to empirically explore this area further effectively contributing to knowledge in this area has been identified.**

**Key words:** SMEs, Innovativeness, Entrepreneurial Orientation, Technological Capability, Environmental Dynamism.

## **INTRODUCTION**

Studies have linked global economic development to the growth of the SME Sector which account on average for 13-50% of the gross national products in the developed world and between 3-35% of the gross national products for the developing world (Ardic et al., 2011). Consistent with the Schumpeterian Theory on "Creative Destruction", it is a well-argued case that without innovation, firms have reduced chances of survival (du Preez and Louw, 2008). Innovativeness has been shown to significantly contribute towards firm performance and is very

pronounced within Small and Medium Enterprises (SMEs) (Covin and Slevin, 1989; Kuratko et al., 2001; Freel, 2000; Ngugi et al., 2013). There is no convergence in knowledge on what actually contributes to innovativeness in SMEs. Ngugi et al. (2013) concluded that innovativeness positively affected the growth of SMEs and that there was a tendency by owner managers to influence the direction and adoption of new ideas and processes ultimately affecting the performance of their entities. This relationship was found to be more

\*Corresponding author. E-mail: [ben@mkalama.co.ke](mailto:ben@mkalama.co.ke).

pronounced in dynamic environments (Miller and Toulouse, 1986). To understand the antecedents of innovativeness within SMEs there is a need to review it uniquely as opposed to reviewing it from a large organization context (McAdam et al., 2007; Ejydys, 2016; Wales, 2016; Pustovrh et al., 2017). This paper reviews what has been done before and identifies areas where there is lack of consensus at the antecedents of innovativeness in SMEs in Kenya.

## **SMALL AND MEDIUM MANUFACTURING ENTERPRISES IN KENYA**

The SME segment is considered to be the most vibrant in Kenya accounting for over 25% of the overall GDP in Kenya (Mwangi and Gachunga, 2014). There are close to a million enterprises in the formal and informal manufacturing sector, out of which, about 174,000 are licensed whereas 700,000 operate as unlicensed (KNBS, 2016). The overall manufacturing sector has been contributing 11% of Kenya income, over the past eleven years (Government of Kenya, 2015). This is notwithstanding the fact that informally, SMEs also contribute significantly to the economy (Mwangi and Gachunga, 2014).

SMEs in Kenya have been associated with low levels of automation and as a result of this; there are limitations on value addition due to their resultant low productivity. In addition to this, there are concerns on the overall level of innovation within the segment (Government of Kenya, 2005; Government of Kenya, 2013). Notwithstanding this, only 30% of firms have patented their innovations in the last 3 years of their existence (Kenya Association of Manufacturers, 2017). There are also instances of innovations not being patented and as such possibility of copyright infringement is real. Against this backdrop, locally studies show that 60% of SMEs fail within their first three years of operation (KNBS, 2016). There is therefore a policy concern to understand what parameters can make this sector be successful. This is against the paradox amongst policy makers that huge investments in science and technology have not necessarily translated into innovation driven economic growth (Caraca et al., 2009).

## **THE CONCEPT OF ENTREPRENEURIAL ORIENTATION**

Entrepreneurial Orientation (EO) as a concept was developed from the pioneering work of Miller, 1983. It can be said to be that latent process, habit or activity of a firm having the capability to reinvent itself in such a manner that it can be able to withstand future external events and shocks (Meadows et al., 1972; Covin and Slevin, 1991; Avlonitis and Salavou, 2007; Wales, 2016). Grounded in

several theories, studies have demonstrated that entrepreneurial orientation should be viewed as a consistent strategic behavior complemented with actions that drive entrepreneurial actions (George and Marino, 2011; Covin and Wales, 2012; Andersen et al., 2015; Wales, 2016). Entrepreneurial orientation is considered to form a key plank of a firm's strategy, despite questions as how it manifests itself in a firm (Wales, 2016). The key dimensions of entrepreneurial orientation include proactiveness, innovativeness, and risk taking (Miller, 1983; Covin and Slevin, 1989) and competitive aggressiveness and autonomy as the additional dimensions (Lumpkin and Dess, 1996). George and Marino (2011) and Wales (2016) have in their respective papers summarized some key areas that require further research. Research has showed that indeed as much as the dimensions can be unique, they can coexist but there is a need for additional work to understand the relationship within these dimensions (Lumpkin and Dess, 2001; Covin and Lumpkin, 2011; Miller, 2011; Covin and Wales, 2012). There are also still divergent views as to whether the dimensions should be viewed separately (uni-) or jointly (multi) (Lumpkin and Dess, 2001; George and Marino, 2011).

Moreover, there is an emerging view that innovation and its antecedents as a key dimension of entrepreneurship orientation has not been adequately conceptualized (Perez-Luno et al., 2010). Some studies have shown that entrepreneurial orientation cannot be treated as a uni-dimensional construct but rather as a multidimensional construct since the key dimensions interact differently and with different outcomes (Lumpkin and Dess, 1996; Kreiser et al., 2013; Ejydys, 2016). It is evident that the construct of entrepreneurial orientation remains incomplete. Indeed there have been persistent calls for qualitative research to build the knowledge in this area. In addition to this, other studies have shown that there are other variables beyond, entrepreneurial orientation that affect innovativeness of firms (Neely and Hii, 2012). Entrepreneurial orientation has been found to be a prerequisite for innovativeness (Hult et al., 2004; Renko et al., 2009; Perez-Luno et al., 2010; Laforet, 2011; Ruiz-Ortega et al., 2013; Ejydys, 2016). Innovativeness has been defined as "the firm's tendency or willingness to participate in support of new ideas, creativity and experimentation as well as to develop creative processes of technological and R&D leadership which result in new products, services or technological processes" (Ruiz-Ortega et al., 2013). Migiro (2005) in a study across 4 towns in Kenya, showed that entrepreneurial orientation affected innovativeness in SMEs. The rate of innovativeness tends to vary from industry to industry. Given the uniqueness of manufacturing sector, in the developing economies, the expectation would have been that discussions in this area would be conclusive but unfortunately that has not been the case. Furthermore, innovation patterns also vary

from country to country (Leger and Swaminathan, 2007; Cornel University, INSEAD and WIPO, 2016). Recent research state that cities where industries are based as well as uniqueness of the occupation are also key to innovation in SMEs (Lee and Rodriguez-Pose, 2013). This has the advantage of the firms sharing a higher concentration of customers, suppliers and employees. Although not conclusively determined it has been postulated that larger cities provide a great environment for innovation (Lee and Rodriguez-Pose, 2013). A similar research for developing economies is lacking. This would create large opportunities for research in view in view of the fact that it create a good understanding and validation on this phenomenon. In as much as limited studies have explored these linkages, Lee and Rodriguez-Pose (2013) established that this linkage tended to be explorative in nature but however indicated a need for additional research in this respect. In all these research, studies on the causal effect thus necessitating a need for longitudinal research would provide additional understanding of the phenomena.

## THE THEORIES OF INNOVATION

Innovation has been identified as the third critical dimension of entrepreneurial orientation. Innovation requires "value" for it to be meaningful (O'Quin and Besemer, 1999; Ngugi et al., 2013). The Oslo Manual defined innovation as "all the scientific, technological, organizational, financial and commercial activities necessary to create, implement, and market new or improved products or processes," (OECD, 2005; Leger and Swaminathan, 2007). Innovativeness has been studied extensively by researchers (du Preez and Louw, 2008) and has been further defined as the process by which an entity changes its operational processes or service, have new or amended products in the markets, with an aim of achieving a more efficient and effective process that ultimately leads to higher margins and growth (Damanpour and Wischenevsky, 2006; Perez-Luno et al., 2010). Innovativeness is therefore considered to be that continuous process which includes the level and potential that creates a new product, service or process that will be commercialized to allow an economic or social impact (Doroodian et al., 2014; Neely and Hii, 2012). By these definitions, we will note that innovation is the "output" whereas innovativeness is the "input". Theories of innovation began with the market-based view of innovation which posits that environmental market conditions provide the background for which a firm will be active in the innovation space (Slatter and Narver, 1994; Porter, 1985). The Linear Models of Innovation further suggests that research and design was the initiating step to innovation followed sequentially by manufacturing and finally marketing and distribution of the product or service (Caraca et al., 2009). This was considered to be a "push"

model.

Subsequently, alternative views postulated that the actual initial step was the market which "pulled" the research process, but in a linear function. The Innovation (Kline) Model argues that innovation is triggered by a market demand followed by a series of research and design activities laced with a set of complex interacting feedback steps that allow further development. The knowledge generated is placed in a knowledge bank to which findings of new research will occasionally be added (Kline and Rosenberg, 1986). Since then additional variants of this model that have integrated the research and design with the marketing function in an effort to explain this concept have been discussed (Leger and Swaminathan, 2007; Caraca et al., 2009). At the turn of the century, the Networking Models gained prominence by stating that over and above the internal linkages of research and design and the need to respond to the market, there is additional emphasis on external circumstances for instance environmental dynamism that affect innovation (Caraca et al., 2009). This model also incorporates the organisational dynamics that affected innovation. In developing the multi-channel interactive model, Caraca et al., 2009 argued that innovation as an outcome was influenced by the existing scientific knowledge interacting with the existing market information and the existing internal organizational knowledge. It is this triple set of influence on the current set of goods and services that in turn determined a new set of goods and services. However, the networking models were criticized as being closed as their source of drive was mainly internal. Subsequently Open Innovation models (OIM) an application of the Open Systems Theory as originated by Ludwig von Bertalanffy in 1956 then gained prominence. Supplementary to the internal idea generation and development, external ideas were accepted and through the use of internal and other external networks that included the knowledge bases of other institutional players (Chesbrough, 2003; du Preez and Louw, 2008). The Open innovation models have however nevertheless been criticized as having simplified the innovation process to linear sequences that are then iterated by external networks and feedback as well as the universal validity of these findings (Trott and Hartmann, 2009; Benezech, 2012). It is evident, that these discussions are still ongoing (Pustovrh et al., 2017) and much of these arguments for manufacturing SMEs need to be backed by empiricism.

Further to this, there is now an emerging body of literature that splits innovation into explorative innovation and exploitative innovation. Explorative innovation works towards new knowledge and focuses on the research component (Aloulou and Fayolle, 2005) whereas exploitative utilizes current knowledge with emphasis on development to attain efficiency or product improvement (Andriopoulus and Lewis, 2009; Jansen et al., 2009; Perez-Luno et al., 2010; Yi-Ying, 2011; Chang et al.,

2011). Subject to environmental conditions, firms that are more proactive in nature will tend to be more explorative in their innovations (Perez-Luno et al., 2010). There are different schools of thought as to where the choice of preference between exploitative and explorative innovation for SMEs will be. One view is that SMEs will adopt exploitative innovation rather than explorative innovation due to their limited resources. There is a need for empirical validation in this area and more so in the developing economies. Another view is that SMEs out of limited choice will adopt the higher risk explorative innovation in order to survive (Laforet and Tann, 2006). This area as well as the motivating circumstances have not been conclusively investigated (Projogo and McDermott, 2014).

SME firms will often try to outsmart each other essentially demanding for innovativeness amongst its players (Ngugi et al., 2013). What triggers this phenomenon? Pioneered in the work of Graham Willis, the Creative Process Models have four iterative steps (Plesk, 1996) namely, the opportunity identification stage followed by the incubation stage. The third stage is called the insight stage and finally the evaluation and implementation stage. The main difference between the older models and the newer models is that older ones are of the view that ideation is more of impulsive and beyond the control of the thinker, whereas the newer ones advocate that ideation is a function of conscious and continuous analysis of the thinker's environment (Plesk, 1996). Holt (2012) further elucidated these as five creative stages namely idea recognition or germination, idea preparation or rationalization, idea incubation or fantasizing, idea illumination or realization and finally verification of the idea. The import of these latter arguments is that there is a conscious effort in making the idea turn into a reality.

## THE ROLE OF TECHNOLOGICAL CAPABILITY

Technological capability is an internal state of readiness to accept change and nurture innovation and entails, "additional and distinct resources needed to generate and manage technical change, including skills, knowledge and experience, and institutional structures and linkages" (Bell and Pavitt, 1995; Arnold and Thuriaux, 1997; Acha, 2000; Alejandra, 2009; Iammarino et al., 2009; Zhou and Wu, 2010). Because we cannot directly measure technological capability, proxies are often used (Acha, 2000). Technological capability varies when firms have different budgetary resource allocations, different top management attitude, technical and organizational competence, economic incentives and appreciation for change, or even an existing pool of innovative knowledge bank, patents or licenses or networks that are available to the firm (Vonortas and Xue, 1997; Acha, 2000; Bell and Pavitt, 1995; Alejandra, 2009; Renko et al., 2009).

Technological capability is limited on the basis of the resources available to the SME firm and is more often than not a function of the personal drive of the owner-manager (Arnold and Thuriaux, 1997).

Arnold and Thuriaux (1997) in June identified three key categories of technological capability as strategic, internal and external which they found to be interdependent and interlinked. This consequently led to a dynamic learning process. The strategic capabilities were more market oriented and firms identified opportunities and bridged the gap between the market needs and the firm's level of competence. On the other hand, the internal capabilities revolved around the tangible and intangible resources and include its assets, human talent as well as the firm's internal processes. The external capabilities include published and available information on the situation, networking arrangements and alliance arrangements between the firm and its business associates and with the customer feedback process. These three categories relate to each other in various ways and depending with unique firm situation. The literature reviewed stops shy of investigating how each of these categories separately or jointly affects innovativeness in SMEs.

Technological capability is also driven by investment, production and linkages (Alejandra, 2009) with each of these elements contributing differently to the final outcome of technological capability (Alejandra, 2009). Investment capability is the amount, willingness and ability to provide resources for investment in technological change. Production technology on the other hand, is the ability to demonstrate mastery or competence over basic technology that is sufficient to make an improvement. Linkage capability refers to the ability to transmit and receive information related to technology from various stakeholders. In addition to this, the firms need to be able to network as well as be able to benchmark as appropriate (Laforet, 2011). However, it has been noted that technological capability by itself will not necessarily lead to innovation as was evident in the case of mobile money adoption in South Africa (Tubbs, 2013).

Technological capabilities in SMEs are affected by the level of support from the owner manager (Yi-Ying, 2011). This relationship was found to be more pronounced in dynamic environments (Miller and Toulouse, 1986). The owner manager also drives connectedness within the firm which allowing for transparent decision making and information availability within the firm (Yi-Ying, 2011). It was established that in SMEs, technological capability together with a high level of centralized decision making and networking allowed innovation to thrive (Chang et al., 2011). With suitable technological capabilities, firms can be conscious of the contemporary technological situation, try out new designs and product innovations (Zhou and Wu, 2010). Some studies have shown that technological capabilities also positively affect entrepreneurial orientation (Renko et al., 2009; Ruiz-Ortega et al., 2013).

Other studies have not been as conclusive (Zhou and Wu, 2010). Arnold and Thuriaux (1997) segmented firms into four block hierarchical categories that are commensurate with their technological capability. At the bottom of the pyramid, are firms with insignificant technological capability and a limited perceived need for technological capabilities. At the top of the pyramid are the real innovators who would probably have a well-functioning "Research and Development" function and are to a large extent explorative. Because of limited resources, many SMEs, will tend to limit their technological capability, pursuing exploitation innovation instead of explorative (Arnold and Thuriaux, 1997). It is argued that the level of technological capability that influences innovation is a function of resources endowed to the SMEs.

Although the relationship between technological capability and exploitative and explorative innovation remains unclear (Zhou and Wu, 2010), Perez-Luno et al. (2010) established that firms with strong technological capabilities will venture into exploitative innovation for product development at an increasing pace. This is because the firms learn from their experience and on the basis of feedback is able to integrate these skills into the design process (Neely and Hii, 2012). A causal relationship is demonstrated here but this requires further investigations. Higher technological capability therefore facilitates a more efficient use of the existing knowledge (Zhou and Wu, 2010). The same study however found that technological capability had an inverted U-shaped relationship thereby restricting explorative innovation. This is because exploratory innovation requires substantial investment of resources. SMEs have limited resources and this relationship is likely to be consistent with the SME patterns. In addition, incorporating new ideas and products into an existing system always has challenges of implementation and thus a decline in further returns in the long run (Zhou and Wu, 2010). These studies are not conclusive and therefore demonstrated a need for further investigations in the area of SMEs.

Whilst some studies point to the idea that SMEs are nimble and quickly adapt to technology for higher growth (Storey, 1994), O'Regan and Ghobadian (2005) concluded that SMEs did not always convert research and development into effective innovation preferring instead to focus on time tested products. It was therefore argued that SMEs are to a large extent focused towards exploitative innovation. However this argument has not been exhaustively validated and concluded (Projogo and McDermott, 2014). Moreover, it was also established that public research expenditure had a positive relationship with innovativeness (Heimonen, 2012). Neely and Hii (2012) was able to demonstrate that there was an inadequate linkage between public research institutes and SMEs. Could it be that SMEs are uncomfortable to commercialize explorative research because of

inadequate linkages? There is broad consensus, that the growth in innovativeness in many countries has been due to specific factors that are essential to innovativeness (Suarez-Villa, 1990; Kortum and Lerner, 1999). These factors included increase in allocation and utilization of research and development resources, direct linkage between patents and value as well as market dynamics. Adequate national policy framework goes creates an environment that is conducive for innovation (Ndemo, 2015). This supports the case for National Innovation Systems being driven by suitable supportive public research which can then be subsequently exploited by SMEs.

## THE IMPACT OF ENVIRONMENTAL DYNAMISM

Environment dynamism is described as the change of the external circumstances under which firms operate (Volberda and van Bruggen, 1997; Lumpkin and Dess, 2001; Wijbenga and van Witteloostuijn, 2007; Jansen et al., 2009;). Environmental dynamism is one of the three dimensions of Environmental Turbulence (Volberda and van Bruggen, 1997). The other dimensions include environmental complexity and environmental unpredictability (Volberda and van Bruggen, 1997). Environmental dynamism manifests itself by way of changing demographics and the resultant shift in tastes and preferences, the advancement of Information Technology as well as globalization and the attendant competition from both local and non-local players. This has meant that SMEs have to continually change their product suites and the way they do their business (Lumpkin and Dess, 2001; Ngugi et al., 2013; Ruiz-Ortega et al., 2013) leading to innovativeness. It was established that there was a significant moderating effect of environmental dynamism on entrepreneurial orientation (Okeyo, 2014).

Environmental dynamism is further defined by either its intensity of change or frequency of the change (Volberda and van Bruggen, 1997) or can be further considered classified as static or dynamic depending on the attributes being considered. Ideally, a longitudinal study would be able to create the causal relationships and how they affect each other (McAdam et al., 2007). Further to this, a review of literature, indicates that most of the studies measure the dimensions of environmental dynamism as one unit rather than as multiple dimensions (Mohammad et al., 2014). To measure environmental dynamism, the Miller's four item approach using a multi-rater scale is commonly used (Garg et al., 2003). In this case, proxies are similarly used as a measure of the changes in environmental dynamism.

The focuses of the reviewed studies have mostly been external environment and its effect on performance leaving a gap on the aspect of environmental dynamism and its related impact on innovativeness. In the contemporary times and with an open-based cultural

context, many entrepreneurs are receptive to external ideas and suggestions. It would be interesting to understand the extent of these changes in culture and how it affects innovativeness.

Culture has been identified as a significant contributor to the external environment affecting firms. On the basis of Hofstede's (1980) and subsequent Trompenaars (1993) Model, a culture whose power distance is low, has greater individualism, particularism and masculinity, acknowledges achievement and abhors uncertainty, is likely to have a thriving entrepreneurial orientation environment. However due to competitive global pressures, many of the traditional cultures are now evolving and gravitating towards the center (Lee and Peterson, 2000). Closely tied to culture, are ongoing and varying conversations on how different regions and locations affect innovativeness in SMEs (Heimonen, 2012). One school of thought suggests that urban areas produce a higher level of innovativeness which is mainly driven by resource allocation and available markets (Covin and Slevin, 1998). There are challenges however on how to accurately and objectively measure changes in culture and their impact on innovativeness.

Martins and Terblanche (2003) argued that there was limited consensus on the type of internal organizational culture required to affect innovation. This provides a scope for further investigations so as to achieve consensus. In addition to this and as a coping measure, SMEs have been known to resort to co-opetition, which is the phenomenon whereby firms cooperate and compete at the same time with a resultant impact on innovation (Gnyawali and Park, 2009). Co-opetition was initially coined by Roy Nord but popularized by Nalebuff and Bredenburger in 1996 (Robert et al., 2009). Its justification was high research and development costs in an environment whereby technology is ever converging as well as the need to harmonize technological standards (Gnyawali and Park, 2009). Other factors included strategic alliances and networking which have similarly and separately been shown to have an effect on innovativeness (Mothe and Link, 2002; Gudda et al., 2013; Osei et al., 2016). The causal effect of strategic alliances and networking has not been well researched. In addition to this is a well-functioning and robust national innovation system that links into the SME segment.

Several external factors including prevalent culture, hostility, dynamism, complexity, life-cycle stage of industry amongst other parameters have been identified as having an influence on entrepreneurial orientation (Covin and Slevin, 1991; Miller, 1983; Lumpkin and Dess, 2001). Environmental dynamism forces firms to be creative in their products and approach to markets (Zhou, 2006). In as much as it is generally accepted that there are cultural diversities, there are limited studies on the impact of culture, and the dynamism involved in the cultural aspect and their impact on innovation (Bwisa and Ndolo, 2011). Most of the studies reviewed have been on

the influence of static culture.

## DISCUSSION

Most of the studies reviewed tended to focus on performance as the dependent variable on, whereas there are other areas that may not have been exhaustively studied (Wales, 2016). It is evident that there are other factors that affect the relationship between entrepreneurial orientation and innovativeness. These factors may be either internal or external. Previous studies have indicated a relationship on these factors amongst themselves. Unfortunately, most of the studies reviewed have been in the developed economies with the scope limited to such economies and lacking a validation from the context of the less developed Economies.

Neely and Hii (2012) in a qualitative study in East England established that innovativeness is affected by culture, resources, skills and networking. However, the low response rate to the proposed sample could be seen to be vulnerable to biases. The study also lacked universal validity, being based in the developed world. This generates additional interest in what really affects innovativeness in firms.

Renko et al. (2009) in a cross sectional survey on Biotechnology firms in US, Finland and Sweden sought to establish the effect of the several independent variables on innovativeness. The study recommended industry specific research to fully understand the relationship. This was an interview based research that had a small sample size that could have affected the statistical validity of the results. The impact of incremental changes in innovativeness by way of longitudinal studies is evidently lacking. In addition to this, by their very nature, SMEs are significantly affected by their external environment and therefore such results may lack universal validity.

Perez-Luno et al. (2010) studied and confirmed that entrepreneurial orientation affected innovation generation and adoption. Like many similar studies, firms that have not recorded any innovations or innovations that have been successful in the market have been isolated from this study. There has not been significant effort to understand why firms are innovative in the first place. The study has also been limited to Spain and thus broader conclusions will be on the basis of generalizations and this may not be always accurate. Being cross sectional in nature, causal relationships may not have been exhaustively investigated. Technological capability positively affects the relationship of environmental dynamism on entrepreneurial orientation (Ruiz-Ortega et al., 2013; Subrahmanya, 2007). It has been demonstrated that technological capability thrives with adequate resources. As a result of this SMEs, that have limited resources will need to have additional strategies which allow them to either form strategic alliances, benchmarking or networking so as to be able to leverage on the unique skills that each small entity will

bring to the table.

Adequate technological capabilities combined with an appropriate environmental dynamism are necessary antecedents for successful innovation (Subrahmanya, 2007). Innovation has been shown to be highest in tough operating environments which are characterized by dynamic technological shifts, severe competition and short product life cycles (O'Regan and Ghobadian, 2005; Yi-Ying, 2011). In addition, SMEs require innovation so as to increase their chances of survival in a harsh terrain (Laforet, 2011; Chang et al., 2011). Ruiz-Ortega et al. (2013) established a significant relationship between environmental dynamism and technological orientation on entrepreneurial orientation. This study however did not isolate the various dimensions of entrepreneurial orientation. Methodologically it was limited to feedback from one manager in each of the sample firms which were all in Spain.

The environmental dynamism has to be such that a sufficient market demand is created so that the invented products or services are appreciated in the market. The interaction between environmental dynamism and the inherent technological capability has created new demands on innovativeness. Bearing in mind that innovativeness tends to be incremental overtime, there is a need for further investigations for causal relationships that are longitudinal in nature so as to evaluate the impact of afore-mentioned factors on innovativeness. In a cross sectional study, Ejdyś (2016) confirmed proactivity affected innovativeness in SMEs. This study however did not explore other factors that could have jointly or singularly affected innovativeness in SMEs in Poland.

Osei et al. (2016) in a study on manufacturing SMEs in Ghana, took the well chartered path of confirming that indeed innovativeness affected growth in SMEs rather than what causes innovativeness. Pustovrh et al. (2017) demonstrated the need to have an understanding of the internal reasons for innovativeness and the final outcome of commercial innovation. Pustovrh et al. (2017) study was however limited in several areas. Firstly, it had the risk of small sample bias coupled with single respondent bias. Secondly, there were challenges on methodology as the operationalization of the various constructs which may either have been inadequate or not exhaustive. There still remains the recurring need for causal research to be able to conclusively exhaust this debate. It is evident, that there is a paucity of information in so far as the antecedent of innovativeness is concerned. Different studies have considered different aspects but no consistent theme has emerged that cuts across all locations. It is therefore important to understand what triggers innovation which would then be easily adapted by SMEs so as to renew their chances of survival.

## CONCLUSION

There is still a need to understand the relationship

between entrepreneurial orientation, technological capabilities and environmental dynamism and their impact on innovation in firms and SMEs in particular. A review of literature, is inconclusive in the study of innovativeness and its antecedents in SMEs. Further, most of the studies on innovativeness have been in developed economies with the scope mostly limited to their economies and lack a universal validity (Zainol, 2013).

## IMPLICATIONS OF THE STUDY

This review creates a need for more knowledge building and validation research on what causes innovativeness in SMEs. It contributes to academic knowledge with specific regard to SMEs whose discourse presently has inconsistent conclusions. Numerous studies tend to be focused on financial performance as an outcome. Due to the fact that measurement of SME financial performance is not always objective in all cases as a result of information unreliability. It is important to consider other measures of outcomes and include them in the discussion. Moreover, a fuller understanding of what generates innovativeness contributes to knowledge. From the practitioners point of view, it is important to understand what really drives innovation. This is more so important for other stakeholders like the financiers, equity holders and venture capitalists among others. It is widely acknowledged that this sector has huge opportunities for investors in as much as it also carries significant risks and it therefore important for all stakeholders to have information that they can use to validate their assumptions. Effectively, this significantly allows them to assume knowledge-based risks, risk being a key attribute for innovativeness.

On the basis of the general agreement that SME development is critical for economic growth, many policy considerations have been adopted by numerous governments to stimulate growth. Due to the paucity of information, with respect to the direct relationship between the antecedents of innovativeness and actual outcome, many of these interventions have achieved varied results. Validation of these relationships at a localized scenario could help to achieve a better focus. It follows that National Innovation Systems can be configured in manner that will enhance innovation which in turn will contribute to positive economic development.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## REFERENCES

Acha V (2000). The role of technological capabilities in determining

- performance: the case of the upstream petroleum industry. In DRUID Winter Conference on Industrial Dynamics, Hillerod, Denmark.
- Alejandra MM (2009). Drivers of Technological Capabilities in Developing Countries: An Econometric Analysis of Argentinian, Brazil and Chile. Available at: [http://globelics2009dakar.merit.unu.edu/papers/1247361519\\_MM\\_1.pdf](http://globelics2009dakar.merit.unu.edu/papers/1247361519_MM_1.pdf)
- Aloulou W, Fayolle A (2005). A Conceptual Approach to Entrepreneurial Orientation within Small Business Context. *Journal of Enterprising Culture* 13(01):21-45.
- Anderson BS, Kreiser PM, Kuratko DF, Hornsby JS, Eshima Y (2015). Reconceptualising Entrepreneurial Orientation. *Strategic Management Journal* 36(10):1579-1596.
- Andriopoulos C, Lewis MW (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization Science* 20(4):696-717.
- Ardic OP, Mylenko N, Saltane V (2011). Small and Medium Enterprises: A Cross Country Analysis with a New Data Set. The World Bank, Financial and Private Sector Development Consultative Group. The World Bank. Available at: <https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-5538>
- Arnold E, Thuriaux B (1997). Developing Firm's Technological Capabilities. Technopolis Limited. Available at: [http://www.technopolis-group.com/wp-content/uploads/2016/05/oecd\\_cap.pdf](http://www.technopolis-group.com/wp-content/uploads/2016/05/oecd_cap.pdf)
- Avlonitis GJ, Salavou HE (2007). Entrepreneurial Orientation of SMEs, product innovativeness, and performance. *Journal of Business Research* 60(5):566-575
- Bell M, Pavitt K (1995). The Development of technological capabilities. In I. Haque, Trade Technology and International Competitiveness (pp. 69-100). Washington: Economic Development Institute of the World Bank. Available at: <http://documents.worldbank.org/curated/en/265331468765926233/Trade-technology-and-international-competitiveness>
- Bwisa HM, Ndolo JM (2011). Culture as a factor in entrepreneurship development: A case study of the Kamba culture of Kenya. *International Journal of Business Management* 1(1):20-29.
- Caraca J, Lundvall BÅ, Mendonça S (2009). The changing role of science in the innovation process: From Queen to Cinderella?. *Technological Forecasting and Social Change* 76(6):861-867.
- Chang YY, Hughes M, Hotho S (2011). Internal and external Antecedents of SMEs' innovation ambidexterity outcomes. *Management Decision* 49(10):1658-1676.
- Chesbrough H (2003). The Era of Open Innovation. *MIT Sloan Management Review* 44(3):35-41.
- Cornell University, INSEAD and WIPO. (2016). The Global Innovation Index 2016: Winning with Global Innovation. In: Dutta S, Lanvin B, Wunsch-Vincent S (Eds.). Beijing/Geneva: Cornell University, INSEAD and WIPO.
- Covin JG, Lumpkin GT (2011). Entrepreneurial Orientation Theory and Research: Reflections on a needed Construct. *Entrepreneurship: Theory and Practice* 35(5):855-872.
- Covin JG, Slevin DP (1989). Strategic Management of small firms in hostile and benign environments. *Strategic Management Journal* 10:75-87.
- Covin JG, Slevin DP (1991). A Conceptual model of entrepreneurship as firm behaviour. *Entrepreneurship: Theory and Practice* 16(1):7-25.
- Covin JG, Slevin DP (1998). Adherence to plans, risk taking and environment as predictors of firm growth. *The Journal of High Technology Management Research* 15(2):175-210.
- Covin JG, Wales WJ (2012). The Measurement of Entrepreneurial Orientation. *Entrepreneurship Theory and Practice* 36(4):677-702.
- Doroodian M, Ab Rahman MN, Kamarulzaman Y, Muhamad N (2014). Designing and Validating a Model for Measuring Innovation Capacity Construct. *Advances in Decision Science* 2014:1-11.
- Du Preez ND, Louw L (2008). A framework for managing the innovation process. In *Management of Engineering and Technology, 2008. PICMET 2008. Portland International Conference on IEEE*. pp. 546-558.
- Ejdys J (2016). Entrepreneurial Orientation and Innovativeness of Small and Medium Enterprises. *Journal of Engineering, Project and Production Management* 6(1):13-24.
- Freel MS (2000). Barriers to product innovation in small manufacturing firms. *International Small Business Journal* 18(2):60-80.
- Garg VK, Walters BA, Priem RL (2003). Chief Executive Scanning Emphases, Environmental Dynamism, and Manufacturing Firm Performance. *Strategic Management Journal* 24(8):725-744.
- George BA, Marino L (2011). The Epistemology of Entrepreneurial Orientation: Conceptual Formation, Modeling, and Operationalization. *Entrepreneurship Theory and Practice* 35(5):989-1024.
- Gnyawali DR, Park BJ (2009). Co-opetition and technological innovation in small and medium-sized enterprises: A multilevel conceptual model. *Journal of Small Business Management* 47(3):308-330.
- Government of Kenya (2005). Sessional Paper No. 2 on Development of Micro and Small Enterprises for Wealth and Employment Creation for Poverty Reduction. Republic of Kenya, Ministry of Labour and Human Resource Development. Nairobi: Government Printer.
- Government of Kenya (2013). Sessional Paper No.3 of 2013 on National Productivity Policy. Government of Kenya, Department of Labour, Nairobi.
- Government of Kenya (2015). Kenya's Industrial Transformation Programme. Government of Kenya, Ministry of Industry and Enterprise Development, Nairobi.
- Gudda P, Bwisa H, Kihoro J (2013). Effect of Clustering and Collaboration on Product Innovativeness: The Case of Manufacturing Small and Medium Enterprises (SMEs) in Kenya. Available at: <http://41.89.101.166:8080/xmlui/handle/123456789/6761>
- Heimonen T (2012). What are the factors that affect innovation in growing SMEs? *European Journal of Innovation Management* 15(1):122-144.
- Hofstede G (1980). *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills, California: Sage.
- Hult T, Hurlley R, Knight GA (2004). Innovativeness: Its Antecedents and Impact on Business Performance. *Industrial Marketing Management* 33(5):429-438.
- Iammarino S, Piva M, Vivarelli M, Von Tunzelmann N (2009). Technological Capabilities and Patterns of Cooperation of UK Firms: A Regional Investigation. Discussion Paper No.4129, Institute for the Study of Labour (IZA). Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1391801](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1391801)
- Jansen JP, Vera D, Crossan M (2009). Strategic Leadership for exploration and exploitation: The Moderating role of environmental dynamism. *The Leadership Quarterly* 20:5-18.
- Kenya Association of Manufacturers (2017). Kenya Association of Manufacturers. (K. A. Manufacturers, Producer) Retrieved 2017, from Kenya Association of Manufacturers. Available at: [http://www.kam.co.ke/SME Development/](http://www.kam.co.ke/SME%20Development/)
- Kenya National Bureau of Statistics (KNBS) (2016). Micro, Small and Medium Establishment (MSME) Survey: Basic Report. Kenya National Bureau of Statistics. GOK.
- Kline SJ, Rosenberg N (1986). An Overview of Innovation. In Landau R, Rosenberg N (eds.), *The Positive Sum Strategy: Harnessing Technology for Economic Growth*. Washington D.C.: National Academy Press pp. 275-305.
- Kortum S, Lerner J (1999). What is behind the recent surge in patenting? *Research Policy* 28:1-22.
- Kreiser PM, Marino LD, Kuratko DF, Weaver KM (2013). Disaggregating entrepreneurial orientation: the non-linear impact of innovativeness, proactiveness and risk taking on SME performance. *Small Business Economics* 20:273-291.
- Kuratko DF, Ireland JS, Hornsby JS (2001). Improving Firm Performance through Entrepreneurial Actions: Acordia's Corporate Entrepreneurship Strategy. *Academy of Management Perspectives* 15(4):60-71.
- Laforet S (2011). A framework of organisational innovation and outcomes in SMEs. *International Journal of Entrepreneurial Behaviour and Research* 17(4):380-408.
- Laforet S, Tann J (2006). Innovative Characteristics of small manufacturing firms. *Journal of Small Business and Enterprise Development* 13(3):363-380.
- Lee N, Rodriguez-Pose A (2013). Creativity, Cities and Innovation: Evidence from UK SMEs. *Nesta Working Papers* 13/10.
- Lee SM, Peterson SJ (2000). Culture, Entrepreneurial Orientation, and Global Competitiveness. *Journal of World Business* 35(4):401-416.

- Leger A, Swaminathan S (2007). Innovation Theories: Relevance and Implications for Developing Countries Innovation. Retrieved from German Institute for Economic Research (DIW). Available at: <https://www.diw.de/documents/.../dp743.pdf>
- Lumpkin G, Dess GG (2001). Linking Two Dimensions of Entrepreneurial Orientation to firm Performance: The Moderating Role of Environment and Industry Life Cycle. *Journal of Business Venturing* 16:429-451.
- Lumpkin GT, Dess GG (1996). Clarifying the Entrepreneurial Orientation Construct and linking it to Performance. *Academy of management Review* 21(1):135-172.
- Martins EC, Terblanche F (2003). Building Organizational Culture that stimulates creativity and innovation. *European Journal of Innovation Management* 6(1):64-74.
- McAdam R, Keogh W, Reid RS, Mitchell N (2007). Implementing innovation management in Manufacturing SMEs: A longitudinal Study. *Journal of Small Business and Enterprise* 14(3):385-403.
- Meadows DH, Meadows DL, Randers J, Behrens WW (1972). *The Limits to Growth*. New York: Universe Books.
- Migiro SO (2005). Small and Medium Scale Manufacturing Enterprises in Kenya: A perspective on Alternative Sources of Financing. University of Zululand, Unpublished Doctorate Thesis.
- Miller D (1983). The Correlates of Entrepreneurship in Three Types of Firms. *Management Science* 29(7):770-791.
- Miller D (2011). Miller (1983) Revisited: A reflection on EO research and some suggestions for the future. *Entrepreneurship Theory and Practice* 35(5):873-894.
- Miller D, Toulouse JM (1986). Chief Executive personality and Corporate Strategy and structure in small firms. *Management Science* 32(11):1389-1410.
- Mohammad AN, Idris WM, Moh'd AL-Ferokh FA (2014). An Empirical Study of the Moderator Effect of entrepreneurial Orientation on the Relationship between Environmental Turbulence and Innovation Performance in Five Star Hotels in Jordan. *International Journal of Business Administration* 5(2):111-125.
- Mothe JD, Link AN (2002). *Networks, Alliances and Partnerships in the Innovation Process*. Boston/Dordrech/London: Kluwer Academic Publishers.
- Mwangi DM, Gachunga H (2014). Effect of Devolution on Small and Medium Enterprises Performance in Kenya. *The Strategic Journal of Business and Change Management* 2(30):583-600.
- Ndemo B (2015). Effective Innovation Policies for Development: The Case of Kenya. *The Global Innovation Index*. Available at: [http://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_gii\\_2015-chapter9.pdf](http://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2015-chapter9.pdf)
- Neely A, Hii J (2012). The Innovative Capacity of Firms. *Nang Yan Business Journal* 1(1):47-53.
- Ngugi JK, Mcorege MO, Muiru JM (2013). The Influence of Innovativeness on the Growth of SMEs in Kenya. *International Journal of Business and Social Research* 3(1):25-31.
- Okeyo WO (2014). The Influence of Business Environmental Dynamism, complexity and Munificence on Performance of Small and Medium Enterprises in Kenya. *International Journal of Business and Social Research* 4(8):59-73.
- O'Quin K, Besemer SP (1999). Creative products. In Runco MA, Pritzker SR (eds.), *Encyclopedia of Creativity* Boston: Academic Press pp. 413-422.
- O'Regan N, Ghobadian A (2005). Innovation in SMEs: The impact of Strategic Orientation and environmental perceptions. *International Journal of Productivity and Performance Management* 54(2):81-97.
- Organisation for Economic Co-operation and Development (OECD) (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data - 3rd Edition*. Paris: Organisation for Economic Co-operation and Development.
- Osei A, Yunfei S, Appienti WA, Forkuoh SK (2016). The antecedents of Process Innovation and SMEs Growth: Empirical Evidence from SME Manufacturing Sector in the Ashanti Region of Ghana. *European Scientific Journal Special Edition* 12(10):163-173.
- Perez-Luno A, Wiklund J, Cabrera RV (2010). The Dual Nature of innovative activity: How entrepreneurial orientation influences innovation generation and adoption. *Journal of Business Venturing* 26(5):555-571.
- Plesk PE (1996). *Models for the Creative Process*. Working Paper, Apul E. Plesk and Associates Inc.
- Porter ME (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press.
- Projogo D, McDermott CM (2014). Antecedents of Service Innovation in SMEs: Comparing the Effects of External and Internal Factors. *Journal of Small Business Management* 52(3):521-540.
- Pustovrh A, Jaklic M, Martin SA, Raskovic M (2017). Antecedents and Determinants of high tech SMEs Commercialisation enablers: Opening the black box of open innovation practices. *Economic Research-Ekonomska istraživanja* 30(1):1033-1056.
- Renko M, Carsud A, Brannback M (2009). The Effect of a Market Orientation, Entrepreneurial Orientation and Technological Capability on Innovativeness: A Study of Young Biotechnology Ventures in the United States and in Scandinavia. *Journal of Small Business Management* 47(3):331-369.
- Robert F, Marques P, Le Roy F (2009). Coopetition between SMEs: an empirical study of French professional football. *International Journal of Entrepreneurship and Small Business* 8(1):23-43.
- Ruiz-Ortega MJ, Parra-Requena G, Rodrigo-Alarcon J, Garcia-Villaverde PM (2013). Environmental dynamism and entrepreneurial orientation: The moderating role of the firm's capabilities. *Journal of Organizational Change Management* 26(3):475-493.
- Slatter S, Narver J (1994). Does the Competitive Environment moderate the market orientation-performance relationship? *Journal of Marketing* 58(1):46-55.
- Storey D (1994). *Understanding the Small Business Sector*. London: Routledge.
- Suarez-Villa L (1990). Inventions, Inventive Learning and Innovative Capacity. *Behavioural Science* 35(4):290-310.
- Subrahmanya M (2007). The Process of technological innovation in Small Enterprises: the Indian way. *International Journal of Technology Management* 39(3/4):396-411.
- Trompenaars F (1993). *Riding the Waves of Culture: Understanding Cultural Diversity in Business*. London, UK: Economist Books.
- Trott P, Hartmann D (2009). Why "Open Innovation" is Old Wine in New Bottles. *International Journal of Innovation Management* 13(4):715-736.
- Tubbs B (2013, July 30). SA Mobile Money flop prompts new ideas. Available at: [www.itweb.co.za/index/...](http://www.itweb.co.za/index/...)
- Volberda HW, van Bruggen GH (1997). Environmental Turbulence: A look into its dimensionality. *NOBO-onderzoekdag*. pp. 137-145.
- Vonartas NS, Xue L (1997). Process Innovation in Small Firms: Case Studies on CNC Machine Tools. *Technovation* 17(8):427-438.
- Wales WJ (2016). Entrepreneurial Orientation: A review and synthesis of promising research directions. *International Small Business Journal* 34(1):3-15.
- Wijbenga FH, van Witteloostuijn A (2007). Entrepreneurial locus of control and competitive strategies - The Monetary effect of environmental dynamism. *Journal of Economic Psychology* 28:566-589.
- Yi-Ying CS (2011). Internal and external antecedents of SMEs' innovation ambidexterity outcomes. *Management Decision* 49(10):1658-1676.
- Zainol FA (2013). The antecedents and consequences of entrepreneurial orientation in Malay family firms in Malaysia. *International Journal of Entrepreneurship and Small Business* 18(1):103-123.
- Zhou KZ (2006). Innovation, imitation and new product performance: the case of China. *Industrial Marketing Management Journal* 35(2):394-402.
- Zhou KZ, Wu F (2010). Technological Capability, Strategic Flexibility, and Product Innovation. *Strategic Management Journal* 31(5):547-561.