FACILITATING INNOVATION IN DEVELOPING COUNTRIES: CHALLENGES AND CHOICES

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ABSTRACT

This paper focuses on explaining the facilitative factors of nurturing innovation in the developing economies. The paper is developed solely from literature and it defines innovation in various conceptualizations from both developed and developing world and their underlying assumptions. It aimed at highlighting the challenges and key policy choices for innovation. The findings lead to the conclusion that, though incremental innovation can be easily managed in developing countries, it can spray vast innovations if right policy choices of innovation options are done. Choices of marketing, service and organizational innovations; social capital for interactive relations and diversity management; improved education systems; crafting of innovation systems; increased gross domestic expenditure on research and development (GERD); and promoting the role of various innovation actors in dissemination of knowledge and R&D results. Increased GERD have facilitated generation of innovations and improved economies for many countries such as that of South Africa and Brazil. Further, in a contextual understanding and analysis this paper affirms the paradigm shift from “system of production” to the “system of innovation” and it opposes the paradigm shift from “traditional” to “high tech” sectoral engagements.

Keywords: Innovation, Competitiveness, R&D, GERD, GDP
1. Introduction

In a broader respect the ideas and assumptions of how development, industrialization and commercialization should proceed are being challenged. This means that they are lacking a clear universal formula, process and timing of their realization (Hammer and Champy, 2001). According to Warren (2000), the key drivers of change in the global economy are competitiveness and productivity; where competitiveness comes from flexibility and productivity comes from innovation. Central to the new thinking about development is the role of innovation in transforming sectors particularly traditional into dynamic innovative systems. The inflexibility, unresponsiveness, the absence of customer focus, an obsession of activity rather than result, bureaucratic paralysis, high overhead have been the legacies of African business practices (emphasis added) as a result of lack of innovation (Hammer and Champy, 2001:33). EOCD (2012) argues that substantial research and development (R&D) efforts are required to provide innovative, sustainable and competitive developmental solutions. R&D, therefore, is among the major factors for innovation (Edquist, 2005; Johnson and Lundval, 2003). The benchmarks for R&D expenditure are based on various sources and actors. Thusly, there is country’s gross domestic expenditure on research and development (GERD), Business expenditure on research and development (BERD), High Education Expenditure on Research and Development (HERD) and Government Expenditure on Research and Development (GOVERD). The determination of chances and levels of innovation are comparatively explained between institutions and countries based on selected benchmark depending on the purpose of comparison (den Hertog et al, 1998; Lundval, 2005; DBIS, 2014). Nevertheless, GERD has attracted more acceptance for international comparison as it covers all other sectoral and institutional R&D indicators. Further, another factor for innovation is social capital (Murphy, 2002), presence of national or local system of innovation (Mwamila, 2004; Mytelka, 2004), the interaction of actors in the innovation process which creates a collective system of knowledge and learning (EOCD, 2012 p.9; Bates and Holton, 1995; Brumbach, 1998).

This paper aims at explaining the facilitative factors of innovation and ways of nurturing innovation in the developing economies context. The paper highlights the challenges and it proposes the policy choices if developing countries need to develop innovations.
2. Literature Review

Innovation: its definition, assumptions, roles and forms

Innovation is defined differently depending on the background, industry orientation and experience of the author (Ernst et al., 1998; EOCD, 2012). According to Ernst et al., (1998), innovation is the process by which firms master and implement the design and production of goods and services that are new to them, irrespective of whether or not they are new to their competitors’ domestic or foreign markets. Kaplinsky and Readman (2000) define innovation by emphasizing its meaningfulness and relating it to upgrading by stating that innovation is introduction of improvements and upgrading is when innovation is faster than competition. Further Kaplinsky and Morris (2001) urge that if the rate of innovation is lower than that of competition; will result in declining value added and market share. Thus, both definitions show that innovation has to be placed in a relative term; how fast compared to competitions. The concept of innovation as explained by Kaplinsky et al., (2001) goes in line with Schumpeterian concept that corporate profit in long run cannot be sustained by control over the market but through the development of dynamic capabilities which arise as a result of internal process, which means learning and innovation (Karol, 2013; Kaplan and Norton,1992).

The concept of innovation lies on four main assumptions. First, firms do not innovate in isolation but do so within an interactive network of other economic and social agents, thus, making interaction an important element in innovation (Murphy, 2002; Lundval, 2005). Scholars are supportive of the interaction of socio-economic agents as an important component of a society that helps to drive long term economic change through the coordination of economic activities, facilitation of collaborations across socio-cultural, political, economic, and technological divides and the institutionalization of cooperation in a society (Murphy, 2002; Fukuyama, 2001; Woolcock, 1998). Such coordination, collaboration and cooperation, in turn, lead to extensive trust in society, civic participation and technological and social innovations. This can be possible where there is good governance in such a society, which can be a by-product of social interaction processes. Second assumption is that innovation is crosscutting, Johnson and Lundval (2003) assert that innovation takes place in all sectors and not only in high tech but equally in traditional sectors such as food processing, service sector and across all firm sizes including micro, small and medium sized enterprises (SMEs). However, Lall and Pietrobelli (2003) argue that depending on the context, innovation has elements of size bias being more skewed in favour of large sized enterprises. Third, assumption is that, all economic and social agents involved in innovation are as well in continuous process of learning (Kaplan and Norton, 1992; Lundval, 2005) and as such the notion of knowledge producer and user has limited conceptual and policy relevance in innovation. Learning in turn is heuristic, long-term and possessing a systemic and incremental character (Kaplan and Norton, 1992). The role of knowledge has increasingly taking a central feature in the analysis of economic progress and institutions carrier of knowledge (Lundval, 2005). The Forth assumption is that, elements of knowledge important for economic performance are localized and cannot easily move from one place to another.
Lundval (2005) argues that interactive learning is socially embedded process and cannot purely be explained by economic analysis without focused R&D.

The role of innovation is also looked at in relation to performance (Bates and Holton, 1995; Kaplan and Norton, 1992; Murphy, 2002). According to Bates and Holton, (1995) define performance as “the outcome of work”. However, Brumbach (1998) defines performance as “both outcome and behaviour”. According to Brumbach the outcome depends on the performer’s behaviour and the behaviour is the outcome or product of mental and physical efforts applied to tasks and can be judged apart from results. Therefore, performance is both how things are done and what is done. Some authors have commented that measuring performance should be comprehensive and must cover all of the key functional areas as opposed to results (Murphy, 2002; Wilkham, 1998). Therefore, when studying performance of any establishment, the financial, customer, internal business and innovation and learning perspectives should be considered (Kaplan and Norton, 1992). In the enterprise context, innovation and learning perspectives considers relations built, attitude and experiences that can uncover skill and service gaps and ultimately foster new thinking, upgrading and innovations which can lead to increased competitiveness (Castells, 1998; Warren, 2000; Nanayakkara and De Zoysa, 2008).

There are various forms of innovation depending on the organization and product life cycle where we can categorize innovation as being disruptive, sustainable, application, product, process, platform, line-extension, enhancement, experiential, value-engineering, value-migration, organic and acquisition, etc. Hammer and Champy (2001) noted that when innovation is explained in terms of change, impact or scope, types of innovation are sustaining or re-engineering, incremental, radical or breakthrough, transformational or disruptive innovation and basic research. Sustaining innovation is outsourced or done by internal R&D team. This innovation is useful with a clearly defined problem and a reasonably good understanding of how to solve it. Incremental innovation is a series of small improvements to an existing product or product line that usually helps maintain or improve its competitive position over time. This innovation is regularly used by companies that need to continue to improve their products to include new features increasingly desired by consumers. The transformational innovation is done when the promoters don’t know the clear problem and its usefulness isn’t as well clear. Innovations of this type are mostly undertaken in collaboration with other actors such as universities because of the risks involved. Radical innovation is ideal when problem is well defined, but the path to the solution is unclear, usually because those involved in the domain have failed to breakthrough. This innovation gives stakeholders an experience of a paradigm shift. Basic researches are done at universities and R&D institutions, usually they lack clearly defined outcomes and they do not necessarily result in a new product or service. In terms of impact to current business and marketing, lead to cannibalization, competitor disruption, market creation categorizations of innovation. When explained in terms of innovation source, there are manufacturer innovation and end-user (or open-market) innovation. The Oslo Manual, developed by Eurostat and the OECD provides a framework to enable innovation measurement and categorization where forms such as Product (good or service), Process, Marketing, organizational innovations are listed (EOCD and Eurostat, 2005; EOCD, 2012). When innovation is explained in terms of social relations, there are creative and responsive (Murphy, 2002). Creative innovations are changes to the firm’s...
structure, technology, or production system driven most significantly by the independent actions of a business person and through the internal workings of the firm. Creative innovations are derived from the firm’s own resource base and are indicative of entrepreneur’s planning capacity, creativity and inventiveness enabled by the use of micro-level trust. Responsive or adaptive innovations are those changes in the firm’s structure, technology, or mode of production driven most significantly by unavoidable short-run changes in the business climate, by imitation of others’ work, or when external assistance was received and enabled by the use of macro level trust.

Enhancers of Innovation

From the assumptions behind innovation, we came across the facts that innovation is interactive and cross cutting; it involves continuous process of learning; knowledge is central feature in of economic analysis, development and application of innovation; and elements of knowledge important for economic performance are localized and cannot easily move from one place to another. These premises trigger a thorough thought on the factors necessary in enhancing innovation. Many scholars have dwelt into the study of innovation and majority has shown that the presence of innovation system and investment in R&D are major enhancers of innovation (Rothwell, 1977; den Hertog et al, 1995; Johnson and Lundval, 2003; Lall and Pietrobelli, 2003; Lundval, 2005; DBIS, 2014). The differences in social and economic development, participation in global economy and enterprise competitiveness between countries have been mainly a result of whether there is a functional innovation system and investment in R&D (Edquist, 2005; OECD, 2012). Additionally, the presence of social capital that massages the actors relations and processes of innovation by trust, networks, intellectual rights, collective action and information sharing and reciprocity has been largely documented (Temple, 1998; Goldsmith, 2002; Besley et al., 1993; Knack and Keefer, 1997; Gamba, 2006). This skewed effect of innovation performance is a function of specific national or sector-specific factors and as such the competitive advantage of sectors and national depends a great deal on how advanced the system of innovation is and well it has generated coherent and interactive knowledge infrastructure and institutions that defines the complexity and sophistication of the system of innovation.

Systems of innovation (SI) as a policy issue has been featured in national policy priorities and commonly known as national system of innovation (NSI) of many countries especially developed ones (Freeman, 1987). NSI is defined as “a network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987). Lundval conception of NSI emphasizes the diffusions of “economically useful knowledge” (Lundval, 1992, p. 12). Such economically useful knowledge can be obtained through systemized and institutionalized methodologies of R&D and synthesized in social capital relations. Edquist (1997) defined SI as “all important economic, social, political, organization and other factors that influence the development, diffusion and use of innovation”. It also assures considerable flexibility in its utility but at once assures in-built complexity. The system of innovation framework is built on a conceptual platforms and proceeds on the generally agreed notion that firms do not innovate in isolation. For this reason, learning organizations have developed modes of interaction with other agents within a national, regional or sectoral system of
innovation (Johnson and Lundval, 2003; Lall and Pietrobelli, 2003; Lundval, 2005). To this end, a system is made of the actors or components which are generally taken as the institutions that define their engagement and are embedded conceptually and in practice within each other such as government organizations, R&D centres, private organizations, consultancy firms and higher learning institutions (Lundval, 2005). Interactions and interdependence are the most important characteristics of the SI approach. The nature of interaction is however complex and defined by the nature of knowledge exchange, and established priori by the rules, the forces of history, and the capacity for action or inaction on part of the actors involved (DBIS, 2014).

Innovation Challenges in Developing Countries

Evidence suggests that innovative effort is on the rise as a share of economic activity; in South Africa for example, in 2008 and 2005 surveys indicated that 65.4% and 51.7% of enterprises were engaged in innovation activities respectively and innovative enterprises spent approximately about 1.7% of the turnover for innovation endeavours, of this (59.6%) was spent on the acquisition of new machinery, equipment and software; 32.6% on R&D; and the remaining 7.8% on the acquisition of other external knowledge. In terms of activities undertaken in relation to innovation, 65.7% of enterprises indicated that they had acquired new machinery, equipment and software, and 45.1% conducted R&D. About 20% of the innovative enterprises indicated that they performed R&D on a continuous basis (OECD, 2007). Though innovation initiatives in Africa are few, the rise in living standards is due to innovation; this has been the case since the industrial revolution (OECD, 2007). Today, innovative performance is a crucial factor in determining competitiveness and national progress. Moreover, innovation is important to help address global challenges, such as climate change, trade politics and global value chains. However, according to the few studies and some anecdotal information, the existing innovative activities in African countries are of the incremental type (Diyamett, 2004; Martin, 2013). The incremental innovations to the larger extent are cheaper and largely achieved through learning by using, rather than R&D. This is mainly the result of current socio-economic environment that most African countries are characterized by abject poverty (OECD and Eurostat, 2005). The situation manifest itself in the form of poor infrastructure, poor local investigation levels, levels of corruption, type and scope of research undertaken and low level of education of human resources at different levels, inadequate research funds, among others (Martin, 2013). Africa has consumers that have low level of literacy who can hardly express their needs through clear-cut invisible hand of the market. The demands for new and improved products that have so much contributed to the development and widespread diffusion of new technologies in developed economies are largely absent especially in sub-Saharan Africa (Lall and Pietrobelli, 2003).

The organizations that supply innovations such as universities hardly assess the needs of the potential consumers before embarking on the development of innovations. These institutions have therefore depended on their perceived need in innovation activities. It is evident also that through user-producer interaction some incremental type of innovation is possible. Since most industrial firms in Africa have no R&D departments and the education level and industrial research orientation of employees is low, collaboration with public R&D institutions and universities are very important. Experience from
developed countries show that knowledge institutions such as consultants, technical support institutions and universities are important contributors of non-codified knowledge to the industrial firms and therefore greatly contribute to the innovativeness of firms (Rosenberg, 1982; Pavitt, 1987; Dosi, 1988 and Senker, 1995 cited in Vinding 2001). In order of firm to acquire, transfer and utilize non-codified knowledge, however, a highly level of absorptive capacity must exist within the firm (Vinding, 2001). This implies that contact with R&D organizations and universities will only be meaningful if firms have the required level of education: this issue is very questionable for most firms, especially the SMEs and it seems to be a major barrier in innovation.

Challenges of innovation are based on number of factors. The economy of most developing countries is characterized by (1) the co-existence of several and quite different sub-systems of innovation that require substantially different set of institutions and rules of the game for the good performance and governance. (2) There are development level differences between areas within a single African country. This has been evident due to unequal distribution of resources by the government; this also creates diversity of sub-systems in innovation analysis; which makes it not useful to talk of a national system of innovation in African context. These diverse sub-systems cannot be dealt with by a single macro policy at a national level, but rather local and sub-sector focused different meso and micro policies that better suit each sub-system which could amount to localized content approach (UNESCO, 2011). This is possibly why the cluster competitiveness and local content approach are gaining prominence in developing countries. Nevertheless, local content approach demands much resources for massive diversified R&D needed, local potential databank and application of knowledge (3) systems of innovation differ in terms of specialization both in production and trade and in terms of knowledge base and exposure. The economically useful knowledge can be obtained through the lacking systemized and institutionalized methodologies of R&D (4) attempts have been made to replicate the system of innovation concept to the situations of developing countries from developed economies (Cimoli, 2000). These initiatives followed the work of Freeman (1987), Lundval (1992), Lundval et al (2002) and Muche et al (2003). However, replication failed due to inherent differences. (5) The broader framework for the system of innovation is derived from Lundval’s (1998) argument that market alone is a poor filter for firm level of innovation. It is obvious that other non-market coordination mechanisms in developing countries are equally important but they are notably weak and suffer from systemic coordination. Prominent among these are the weak structure of research and development (R&D), finance support, standard and quality centres and inadequate and declining system of education (UNESCO, 2011; Turyagyenda, 2004). The system of education can produce ill-made human resources detrimental for innovation success. In the context of underdevelopment, the weight of empirical analysis would need to take consideration of three aspects, first the structures of production which are mainly low cost/low wage; second, the system of knowledge accumulation would include the role of formal institutions and the process of learning that craft human capital in addition to the skills employed within firms and knowledge organization; third, while the ideal focus of industrial production is the private enterprises in a developed market, the state in underdeveloped areas have hidden control of the commanding heights of the economy. Policy and political coordination rather than the market have been the dominant institutional interventions in
developing countries. One can conclude that, political will especially on R&D is important in innovation facilitation in developing countries.

3. **Recommendations on Choices and Policy implications**

The first choice with policy implication is developing *stability of potential market*. Developing countries with big populations should be guided to spend their income to locally produced goods. This enables quality of local and traditional produces to be improved to meet continually changing tastes and demands of customers who are continuously gaining exposure. Mytelka (2004) asserts that innovation is not shifting away from traditional to high tech processes but is adding value using the non-codified or tacit local knowledge. The foreign direct investment (FDI) through licensing has been used to undermine the use and link of local knowledge to the process of innovation in manufacturing sector (Mytelka, 1998).

The second recommended choice is the concentration on *incremental innovation*. It has been observed that incremental innovation is something developing countries can manage (Diyamett, 2004). This is due to low cost and risks involved and also low withdrawal costs in case of demerits. The OECD (2005) describes incremental innovation as demand driven series of small improvements to an existing product or product line that usually helps maintain or improve its competitive position over time.

Another choice is the *organizational innovation* which is divided into structural organizational innovation and procedural organizational innovations. Structural organizational innovations influence, change and improve responsibilities, accountability, command lines and information flows as well as the number of hierarchical levels, the divisional structure of functions, or the separation between line and support functions. Such structural organizational innovations include, for example, the change from functional into product or customer-oriented structure or business units. Procedural organizational innovations affect the routines, processes and operations of a company. Thus, Arnbuster et al (2008) argues that these innovations change or implement new procedures and processes within the company; they influence the speed and flexibility of delivery or the quality of delivery. Organizational innovation can also be an intra-organizational and inter-organizational dimension. While intra-organizational innovations occur within an organization, inter-organizational innovations include external environment. The organizational innovations give actors in developing countries a wide choice for innovation interventions and offer a manageable starting point in innovation endeavours.
Focus of Organizational Innovation

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<tr>
<th>Intra-organizational</th>
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<tr>
<td><strong>Type of Organizational Innovation</strong></td>
<td><strong>Structural Innovation</strong></td>
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<td>Cross-functional teams</td>
<td>Cross-functional teams</td>
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<td>Decentralisation of planning, operating and controlling functions</td>
<td>Job enrichment/job enlargement</td>
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<td>Manufacturing cells or segments</td>
<td>Simultaneous/concurrent engineering</td>
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<td>Reduction of hierarchical levels</td>
<td>Continuous Improvement Process/Kaizen</td>
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<td>Cooperation/networks/alliances (R&amp;D, production, service, sales, etc)</td>
<td>Quality Circles</td>
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<td>Make or buy/Outsourcing</td>
<td>Quality audits/certification (ISO)</td>
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<td>Offshoring/relocation</td>
<td>Environmental audits (ISO)</td>
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<td>Zero-buffer-principles (KANBAN)</td>
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<td>Preventive maintenance</td>
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<tr>
<td>Just-in-time (to customers, with suppliers)</td>
<td>Just-in-time (to customers, with suppliers)</td>
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<td>Single/dual sourcing</td>
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<td>Supply Chain Management</td>
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Source: Armbruster et al (2008)

Another choice is the marketing innovation. Marketing innovation is important for competitive advantage and maximization of shareholder value. It is defined as the plan to incorporate the advances in marketing science, technology or engineering to increase the effectiveness and efficiency of marketing, to gain competitive advantage and increase shareholder value. EOCD define marketing innovation as the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. It improves marketing by improving strategy, research, communications, operations, and analysis. It increases shareholder value through improving the lifetime value of the customer, improving their probability of spreading positive word of mouth, increasing their engagement, and the chance they will share their ideas for new products and services, with us. The answer may not be in a way that increases revenues. Marketing innovation improves the customer experience, improves the margin and results in a better use of available resources. It is important to have the proper understanding of marketing innovation to develop an effective marketing innovation strategy for avoiding competitive disadvantages. The distinguishing feature of a marketing innovation compared to other changes in a firm's marketing instruments is the implementation of a marketing method not previously used by the firm. The Innovation Survey 2008 in South Africa indicates that out of 65.4% of enterprises were engaged in innovation activities 27.1% engaged in marketing innovations. Thus, marketing innovation is stratified, affordable option for innovation to developing countries. It allows gradual developing of customer focused innovation.

Another inevitable choice for developing countries is investment in R&D through increasing Gross Domestic Expenditure on research and Development (GERD). The differences in social and economic development, participation in global economy and enterprise competitiveness between countries have
been mainly a result of whether there is a functional innovation system and investment in R&D (Edquist, 2005; OECD, 2012; Rothwell, 1977; den Hertog et al, 1998; Johnson and Lundval, 2003; Lall and Pietrobelli, 2003; Lundval, 2005; DBIS, 2014). The R&D will facilitate the generation of useful economic knowledge which results into innovations.

4. Conclusion

First the partnership between governments, industry and universities is the essential determinant in innovation-led development. Adaptation of imported innovation concepts to local contexts and re-conceptualized from local perspectives is important for innovation to emerge. Second, innovation at higher levels involves a lot of research, which takes time for learning and adaptation and need of adequate funding in order to bear fruits. Radical innovations for example, enquire strong science base and a lot of funds. Third, the value of indigenous knowledge is of emphasis. Africa’s ancestors had a lot of knowledge but there is no trace of such knowledge and this is purely a neglect of indigenous knowledge and therefore lack of innovation starting point. Fourth, there is a great need to review, revisit and redesign higher learning institutions’ curricula and introduce practical centers of excellence. Fifth, taking in mind the diversity of economic system in developing countries, the cluster and local content approaches are recommended for innovations initiatives. However, a clear conceptualization of the approaches for policy relevance is lacking. The understanding of cluster at a level including their origin, growth patterns, internal dynamics and limitations is very important for innovations purposes. Again the local content approach dictates massive and diverse local researches and application knowledge. Sixth, developing countries would take advantages of foreign direct investment (FDI), in which other than capital, investing companies transfer other important assets such as technological innovations, management and organizational expertise. Africa should see investors as source of knowledge and technologies, because they systematically invest in R&D and develop incremental innovations in their routine operations.

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