

POLICY SUPPORT FOR INNOVATION AT GRASS ROOTS IN DEVELOPING COUNTRIES: PERSPECTIVES FROM NIGERIA

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ABSTRACT

Purpose: This paper examines government Science, Technology and Innovation (STI) policy support for Grassroots Innovation (GRI) in the context of a developing country.

Methodology: Drawing from existing literature and case studies from Nigeria, it critically analyses the roles that policies play in GRI.

Findings: The findings reveal:

1. The need for improved conceptual clarity, that is, a distinction in GRI categories into: innovation from, for, at and by grassroots, as this enhances knowledge accumulation
2. That traditional policy approaches do not adequately support GRI and
3. The need for a re-evaluation of existing innovation policies and the development of frameworks and policy instruments that support GRI.

Value: Develops a conceptual framework, and suggests areas where policies could promote GRI activities—for example, in strengthening innovation capabilities, innovation ecosystems and actors, policy making,

stakeholder engagement, knowledge production and circulation and STI funding – there by helping address societal challenges and contribute to sustainable socio-economic development.

Keywords: government public policy; innovation at grassroots; Science, Technology and Innovation; STI; Developing Countries; DCs; Nigeria.

INTRODUCTION

The notion that Science, Technology and Innovation (STI) are critical to development is a globally accepted statement of fact. The implication of this statement is now being taken more seriously in Developing Countries¹ (DCs), where STI is seen as the route (and in some quarters, maybe the only sure route) to addressing the pressing societal, economic and developmental challenges facing these nations (Acs and Naudé, 2011; Chataway et al., 2005; Lundvall et al., 2009). In a bid to 'leap-frog' and 'catch-up', DCs are often times caught between formulating and implementing divisive public (including STI) policies² that either focus on 'mission-oriented' innovation activities (like going to space or putting a man on the moon) or policies geared towards supporting innovation and development at grassroots level. Evidence from various public programmes such as the space industry in India and Nigeria, nuclear power technology in North Korea, and the 'National Car' project in Malaysia, suggest that this is the case. These examples suggest that the focus on such government public policies, which are highly skewed towards 'mission-oriented' innovative activities, often put a heavy burden on public finances at the expense of socially balanced economic development, and as a consequence, neglect important innovation activities at grassroots level. This ought not to be so. Innovation policies targeted at mission-oriented initiatives and those formulated to support innovation at grassroots should be complementary, not mutually exclusive. The end product of this one-sided approach in DCs is that innovation policies targeted at grassroots are non-existent or ambiguous, thus offering little or no support.

When the term 'Grassroots Innovation' (GRI) was used in Honey Bee Network about 25 years ago, it was intended to imply indigenous innovation from the informal sector by local communities without formal education and training (Gupta et al., 2003). Despite the fact that the concept of GRI and the institutional structures that shaped GRI have now evolved and expanded to be included³ in the National System of Innovation (NSI⁴) in some DCs, some of the terminologies and initial understanding of the concept that brought GRI to prominence have remained. The problem therefore is that policies mostly fail to recognise the potential

¹ Based on World Bank 2012 classification.

² In the context of this paper, STI policies are considered as public policies.

³ Implicitly in most cases and less explicitly.

⁴ The network of institutions in the public and private sectors, whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987; UNCTAD, 2013).

contributions of innovation at grassroots to economic development. Evidence from Nigeria suggests, one of the possible reasons for this is because policymakers underestimate the contribution of innovation at grassroots, and dismiss them as small scale, local, only-fit-for-community-use, 'unscientific' and carried out by 'illiterates' (i.e. individuals without formal education and training).

In this paper, I analyse policy support for innovation at grassroots in the context of a developing country using Nigeria as the illustrative case. Innovation at grassroots as a scholarly concept is relatively new in Nigeria. Therefore, in my analysis I draw insights from existing literature on GRI.

In the section that follows, I define Innovation at Grassroots, as used in this paper and distinguish it from related categories.

DEFINITION

Despite increasing international interest in innovation activities observed at grassroots level and its application across a wider range of sectors, as with several STI and Science, Technology and Society (STS) concepts, there is still no universally accepted definition. The framings and narratives currently used to describe these innovative activities exhibit substantial conceptual differences and inconsistencies in literature and in practice (Smith et al., 2014). These differences arise because, as I discuss later in this paper, innovation from/for/at/by grassroots level often involve multiple interactions between polarised conceptual domains, sometimes blurring boundaries between informal and formal, individuals and professionals versus corporations, local and global, social and economic, user and producer (Iizuka, 2013). Furthermore, because the context, rate and direction of innovation (Stirling, 2009) are important, for example, whether occurring in developed versus developing countries, the radically diverse institutional settings muddle these boundaries further. While a clear distinction can be drawn in some national contexts between formal and informal sectors, this line is rather fuzzy and indistinguishable in other countries. In this paper I argue that these and other terminologies, such as, 'below the radar innovation' (Kaplinsky, 2011a), 'pro-poor innovation' (Kaplinsky, 2011b), 'innovation for the bottom of the pyramid' (Prahalad, 2005), 'frugal innovation' (Zeschky et al., 2011) and 'inclusive innovation' (Chataway et al., 2013; Paunov, 2013), although well-intentioned, have unwittingly compounded this challenge. The position adopted in this paper is in line with Gupta (2013), who maintains that the use of terms such as 'bottom of the pyramid' in reference to innovation at grassroots is extremely unfortunate, in that they detract from the important contributions of innovation at grassroots to economic and national development.

Gupta (2014) building on research, knowledge and evidence gathered over the last three decades, has made advances in this regard by helping to provide conceptual clarities on the characteristics of innovation from, for, at and by grassroots. In this paper therefore,

I differentiate between four categories of grassroots innovation. I use different terms to characterise each category. I refer to the first category as: innovation from⁵ grassroots; second category: innovation for⁶ grassroots and third category: innovation at grassroots. The fourth category relates to innovation (in traditional knowledge) by grassroots individuals and communities. So long as the innovative form, feature or function can be distinguished from the traditional knowledge and the innovation has emerged at grassroots level through the unaided efforts of communities and/or individuals, I include them under GRIs based on traditional knowledge (Gupta, 2014).

For the rest of this paper, as stated in the title, I focus on innovation at grassroots, as this category most appropriately describes the innovation activities and case studies discussed later in this paper, as observed in Nigeria's context. Again, drawing from (Gupta, 2014) I define⁷ innovation at grassroots as:

The innovation that may be developed jointly by NGOs, formal sector or individuals in the informal sector or unattached professionals, or companies in collaboration with local people [not necessarily local innovators]

A distinction is made in these definitions between corporate contributions from individual or non-profit organisations in innovation for grassroots and innovation at grassroots. These distinctions in definitions are important both conceptually and operationally as they aid policymakers in institutions in the formulation and implementation of innovation policies (aimed at fostering innovation-led economic growth and development) by recognising the respective strengths and weaknesses in each category. It is desirable that formal sector (public and private) Research and Development (R&D) organisations, corporations or government departments work with grassroots innovators to take their ideas forward. So long as the original innovation is developed at grassroots level and without outside help, this is considered to be a partnership between formal and informal sectors (Gupta, 2014).

In this paper, I advocate for this broader conceptualisation of innovation at grassroots. I show in later sections, in line with the definition advanced, that innovation at grassroots is not necessarily confined to informal sector, community-based or local people since they may be developed jointly by NGOs, formal sector, individuals in the informal sector, unattached professionals or companies in collaboration with local people who may or may not be

⁵ GRI (i.e. innovation from grassroots, GRI): Innovation by common people having no professional degree or diploma, self-employed, working in the informal sector. Innovation from grassroots is the innovation developed (and have been tried) by local people themselves without outside help – the original GRI (Gupta et al., 2003).

⁶ Innovation for grassroots: innovation developed by individuals or organisations for improving the socio-economic conditions of the communities and/or individuals at grassroots, that is, in the villages or urban areas particularly disadvantaged areas and communities.

⁷ Thanks to Anil Gupta for his contributions, greater insights and clarity on the definitions of the four categories of grassroots innovation in addition to the review of the paper.

innovators themselves. This position is supported by empirical evidence from Nigeria. I build on the work of Siyanbola et al. (2012) and examine some of the characteristics of innovation at grassroots cases in Nigeria, with the aim of discussing how policy support and interventions might help in the innovation activities observed. The question this paper therefore seeks to address is: in what ways can government public, especially STI policies better support innovation at grassroots in Nigeria (and DCs in general)?

LITERATURE REVIEW

In the literature, the role of innovation at grassroots in contributing to economic growth and development is well researched and documented. This is especially important in Sub-Saharan Africa (SSA) where, despite rapid economic growth recorded over the past few decades, poverty reduction efforts are yet to yield expected results (Chataway et al., 2013; Paunov, 2013). By involving NGOs, formal sector, individuals in the informal sector and local people collaborating with companies, innovation at grassroots has been shown to respond to local problems (Seyfang and Smith, 2007), improve the quality of life and support Sustainable Development (SD) (Smith and Seyfang, 2013). Although slight differences may be observed across countries or regions, the actors and processes involved are similar in their vision regarding local problem-solving (Smith et al., 2014).

The recognition of innovation at grassroots level, in addition to becoming a major discourse in innovation literature, is also becoming a prominent feature in scholarship on SD and STS discourse (Gupta, 2012; Juma et al., 2013; Smith and Raven, 2012; Smith et al., 2005). There is also increasing interest in other related disciplinary areas, such as, STI, energy, environment and climate (Hargreaves et al., 2013; Seyfang and Haxeltine, 2012; Seyfang and Smith, 2007; Smith et al., 2005), governance and public policy debates across the world. Evidence from Africa suggests that the potential of innovation at grassroots as a mechanism for addressing agriculture, environmental, economic growth and SD challenges is being closely monitored in various quarters (Letty et al., 2012; Marcelle et al., 2014; Siyanbola et al., 2012). In the section that follows, I examine innovation at grassroots and public policy.

Innovation at grassroots and public policy

National innovation policies typically focus on supply-side interventions in mainstream market, that is, firm-level innovation, fostering entrepreneurship, and links between formal science and innovative activity, in particular, R&D intensive activity (Lundvall, 1992). As a result, innovation at grassroots level which arise due to various factors, some of which according to Smith et al. (2014) are a reaction to local problems – such as agricultural needs, food supply, social injustices and environmental needs – often remain unrecognised and unsupported by existing innovation policy. Yet, such innovative

activity can open up spaces for knowledge production that could be relevant to innovation policy, bringing about much needed plurality in the pursuit of economic development.

Smith et al. (2014) identify three challenges that confront innovation at grassroots:

1. the capacity of grassroots activity to attend to local specificities whilst simultaneously seeking wide scale diffusion
2. appropriateness to existing situations that such innovation ultimately seeks to transform and
3. the ability to work with project-based solutions to goals whose root causes rest in structures of economic and political power.

These challenges point to conflicts between the approaches adopted at grassroots level and those adopted by policy actors in the mainstream. Thus, the question of how to leverage knowledge from grassroots-led innovation to populate the mainstream system without compromising diversity at grassroots remains a challenge (Seyfang and Smith, 2007).

In order to enhance the pace and direction of innovation (Stirling, 2009) at grassroots, Chataway et al. (2013) call for a more holistic and balanced policy approach that considers the complexity of innovative activity, the role played by the poor as producers and consumers, the constraints of innovation and the key sets of actors involved in the development, promotion and diffusion of such innovation. In the next section, I discuss what we already know about innovation and innovation at grassroots in the particular context of Nigeria.

Innovation at grassroots – what we know

In the recent past, scholars have paid increasing attention to innovation at grassroots, SD, STS, STI and public policies. We know that innovation as a field of study is still evolving (Martin, 2012) and that ambiguities still exists in the definition of innovation at grassroots. In addition, frameworks, mechanisms for scouting, mapping and documenting innovation at grassroots are still in their rudimentary stages of development. Rather, the current innovation at grassroots discourse continues to be predominantly based on context, locality and sector (Smith et al., 2014). We also know that there is empirical evidence in support of innovation at grassroots level, with examples from countries such as India (Gupta et al., 2003; Gupta, 2013), Malaysia (Hilmi, 2012), Nigeria (Siyانبola et al., 2012), South Africa (Letty et al., 2012), China, Latin America, USA, UK and so on. Furthermore, we know that innovation in DCs and innovation at grassroots occurs predominantly in the informal sector, (Kaplinsky, 2011b; Iizuka and SadreGhazi, 2011). It involves local people (Gupta et al., 2003; Smith, 2011) and is driven by factors such as poverty and hardship (Gunu, 2010; Onasanya et al., 2006). In line with the definition presented earlier, we also now know that, innovation at grassroots may be developed jointly by NGOs, formal sector or individuals in the informal sector, unattached professionals or local people in collaboration with companies (Gupta, 2014).

As is the reality in most DCs, African countries operate large informal economies typically characterised by small scale operations, low entry barriers, labour intensive methods of production, skills often acquired outside the formal sector, unregulated and competitive markets and the use of adapted technology (Kraemer-Mbula and Watu, 2010). For many years, and because of these characteristics, policymakers have labelled the informal sector as “hidden, underground, shadow, black, invisible, subterranean, or extra- legal” (Müller, 2010, p.13). As a consequence, policies have failed to actively address the needs of the informal sector. Yet, the informal sector continues to grow as evidenced by the increasing share of employment, reaching as much as 60% of total employment (ILO, 2009). Nevertheless, as pointed out earlier, these informal activities are not always local and informal. In some cases they collaborate with formal structures (e.g. companies) and enterprises in the development of innovative products, processes and solutions aimed at addressing local needs (Kraemer-Mbula and Watu, 2010). As I discuss in Section 4, this is the situation observed in Nigeria. With innovation at grassroots predominantly occurring in the informal sector, it is logical that dedicated efforts be directed towards supporting such activities. In the section that follows I discuss innovation policies in Nigeria showing the gaps that currently exists.

Innovation policies in Nigeria

Nigeria’s first innovation policy was recently formulated in 2012, as part of a policy document that combines STI policies into one national strategy. Prior to 2012, the country operated National Science and Technology (S&T) policies. Nigeria’s first national S&T Policy was produced in FMST (1986). Since then, there have been various revisions and updates to the S&T policy aimed at incorporating new developments and improvements. These policy reviews have been driven by failures identified in existing S&T policies and the need to foster economic development. The aim of the first (i.e. 1986 S&T) policy was to use S&T knowledge to ensure better quality of life for the people (FMST, 1986). The policy was reviewed in 1997 to lay more emphasis on collaboration, coordination and management of the S&T system (Siyanbola, 2011). Regrettably, these policies failed to incorporate innovation at grassroots.

Siyanbola (2011, p.16) further records that in 2003, “there was another attempt to review the S&T policy”. This attempt was to take account of lapses observed in the implementation of the 1997 policy, especially on the need to address the institutional frameworks that should foster interaction among the various elements of the NSI⁸ while incorporating a programmatic approach to policymaking in Nigeria. The policy review gave rise to prominent flagship government programmes, such as, Biotechnology, Information and Communication Technology (ICT), Space Science and Technology, Energy and Engineering Materials. The 2003 ‘policy’ document nevertheless failed to adequately address issues of S&T culture,

⁸ The network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987).

the harmonisation of S&T policy with other socio-economic policies. Like other extant S&T policies, it also failed to neither capture innovation at grassroots nor specify areas of policy support for innovation at grassroots activities.

In 2005, the Ministry embarked on another revision under the Nigeria/UNESCO STI reform initiative. This introduced and adopted the NSI approach as a framework for STI system reform, resulting in the paradigm shift from S&T policy to STI policy. The current national STI policy of 2012, with a strong focus on innovation, is expected to propel Nigeria to the year 2020, at which date Nigeria hopes to be one of the top 20 economies of the world – Nigeria Vision 2020 (NV2020) (NPC, 2014). The 2012 national STI policy makes reference to ‘indigenous knowledge and technology’ and ‘locally developed technology’ (FMST, 2012, p.5), without providing clear indications of the scope of technologies covered by these terms. It builds on the policymaking experience gathered over the past 25 years at FMST (2012). In spite of this policymaking experience and recognition of the role of innovation as a driver of socioeconomic development, Nigeria’s 2012 National STI policy fails to explicitly capture or address the critical role of innovation at grassroots and its potentials to development as the nation strives towards achieving NV2020. This represents a major gap in the Nigeria’s national innovation policy.

The next section provide insights on policy support for innovation at grassroots in Nigeria – starting, on a broader level, with discussions on policy support in Africa.

Policy support for innovation at grassroots in Nigeria

So far, traditional policy approaches inadequately address the needs and dictates of innovation at grassroots in the African setting. Furthermore, capturing such innovative activities for analysis and policy development is challenging (Marcelle et al., 2014; OECD, 2005; Siyanbola et al., 2012). The status quo in the continent is that government STI policies do not yet target innovation at grassroots. As a result, specific policy approaches are required to facilitate the development of innovation at grassroots in the continent. While there is empirical evidence that points to measurable successes traceable to innovation at grassroots in areas such as technology, energy, microfinance, education, agriculture and many others, authors such as Conway et al. (2010) and Juma et al. (2013) maintain that the appropriate policy support necessary, for example, in scaling up, is still lacking. This raises questions on the role that policy could play in supporting innovation at grassroots. The case of Nigeria is no different. Despite the lack of policy response, cases of important innovation at grassroots in Nigeria are well documented (FMST, 2010; Siyanbola et al., 2012). The challenge, therefore, is to have appropriate government public policies in place that could support innovation at grassroots in ways which include development of appropriate framework, scouting, disseminating and diffusion, mapping and documenting, and in cases where applicable, providing the enabling environment that fosters collaboration between local people and companies (Daniels, 2014; Marcelle et al., 2014).

In spite of data showing hundreds of innovation at grassroots for addressing local problems and with the potentials for meaningful contributions to development (FMST, 2010), recent evidence reveals that Nigeria's recently formulated S&T and STI policies do not support, capture, address or integrate innovation at grassroots into the existing NSI governance structure (FMST, 2012). This is the general trend in most African countries' national innovation policies. Examples of this can be seen in national STI policies and strategies of countries such as Egypt, Ethiopia, Kenya and South Africa.

DISCUSSION

The fuzziness of the term innovation remains a source of much debate and empirical study. Nevertheless, at the core of the concept of innovation is novelty (Lundvall, 1992). This newness can be in the form of new or improved products (goods and services), processes, organisational or managerial practices. The novelty, in broader sense, can also be considered in terms of newness to the firm, organisation or geographical location (OECD, 2005).

Related to innovation is diffusion – the way in which innovation spreads, from different communities, regions or countries to different industries, markets and firms. Diffusion is necessary for the adoption and commercialisation of innovation to result in an economic impact (OECD, 2005). Adoption is used here to refer to the transfer of innovation to the circumstances of a local society and region (Harriss-White and Rodrigo, 2013). The adoption, adaptation, absorption, upgrading and diffusion of available technology are therefore critical components of innovation (Lundvall, 1992). This has been shown to be not only true in developed countries but in DCs (UNCTAD, 2007) and in Nigeria's context (Siyanbola et al., 2012). In the next section, I examine innovation at grassroots in the Nigerian context and discuss three cases, which help illuminate our understanding.

Innovation at grassroots in Nigeria

Examples of innovation at grassroots in Nigeria are documented. FMST (2010), in one publication alone records a hundred⁹ such innovative activities spread across the nation. Ad hoc presidential and ministerial committees¹⁰ have been set up to capture and investigate their existence, potentials for addressing local problems and possible contributions to sustainable economic development. Nevertheless, the absence of supporting innovation policies, as discussed in preceding sections, means that these efforts have been unsystematic. Siyanbola et al. (2012) in *Indigenous Technologies and Innovation in Nigeria: Opportunities for SMEs*, examine three successful indigenous innovation

⁹ Some of these, as of the time of the publication, were still considered inventions.

¹⁰ Such as Presidential Standing Committee on Inventions and Innovations (PSCII) – (see FMST, 2010).

at grassroots cases in Nigeria that have developed around particular communities, industries and regions. These country cases yield useful insights for improving our understanding in various ways.

Firstly, they confirm the existence of innovation at grassroots activities in Nigeria.

Secondly, they reveal that in line with the arguments advanced in the literature reviewed, innovation at grassroots in Nigeria is led by local people, driven by response to local problems and embody the interests and values of these communities (Chataway et al., 2013; Paunov, 2013). In addition, they involve networks of actors, professionals and organisations (Seyfang and Smith 2007). Furthermore, they focus on economic development activities (Smith and Seyfang, 2013).

Thirdly, the cases reveal that innovation at grassroots level, in Nigeria's context, is also widely observed. In addition to being community-based, they draw from local people and professionals in local groups (not necessarily innovators), NGOs and cooperatives in the informal sector who have developed their skills through informal training (i.e. apprenticeship). The cases also provide evidence of joint development of innovation products by the NGOs, formal sector (e.g. research institute) and individuals in the informal sector, mostly unattached professionals. Lastly, we find examples of companies in collaboration with local people (Siyanbola et al., 2012, p.66). These characteristics are also reflected in the cases reported in FMST (2010).

In this paper, I make a note that many retired scientists, teachers, professionals or other workers from industrial sector or government may go back into the communities [rural or urban] and try to solve local problems as individuals. Since they have been part of formal sector, I treat this group as professionally designed innovation for grassroots by individuals, as defined in Section 2. They are therefore not included under innovation at grassroots. This is because the relative difficulties faced by a person who has never been part of formal or organised sector cannot be compared with those who have experience of formal institutions (Gupta, 2014). This position is in line with Smith et al. (2014), who examines innovation from people and organisations, for example, from engineers and designers, coming outside local communities into rural communities. The authors argue that this innovation driven from the 'outside' still uses local knowledge, puts rural communities in the lead and is framed around addressing local needs. Therefore they do not undermine the importance of the original concept of GRI, as defined in preceding sections and as used in earlier works (see e.g. Gupta et al., 2003). They do, however, extend the initial understanding. More important is that the ideas reflect the evolution and reimagining of the concepts of innovation originating at grassroots.

With the sectors, actors, knowledge sources and other characteristics of innovation at grassroots examined, in the next section I focus attention on the concrete realities in Nigeria.

Innovation at grassroots – Nigeria country cases

In this section, I analyse three cases: Aluminium pottery in South-West, Nigeria; Bronze casting in South-South Nigeria and Leather tanning in the Northern part of Nigeria. Empirical evidence suggests that these examples fit the characteristics of innovation at grassroots, as described in the foregoing sections. I present the three cases¹¹ below:

Case 1: Innovation in Aluminium Pottery

In the Aluminium Pottery case, the local innovators involved reside in geographical delineated communities. Skills are acquired through on-the-job training, through oral instructions, observations and especially, learning-by-doing and traditional apprenticeship. No formal education is involved. The innovation (i.e. newness) in the aluminium pottery can be observed in the three dimensions of technology:

1. method (improvements in the techniques involved)
2. material (use of a wider range of aluminium materials from various sources for example, scrap cooking utensils) and
3. applications (greater versatility of products, wider range of use).

By utilising local resources in the development of innovative products, the aluminium pottery addresses local needs – such as generating informal job opportunities, creating wealth, contributing to social cohesion and promoting sustainable development. The success of this innovation is demonstrated by its diffusion from its local geographical origin of Saki to other parts of South-Western Nigeria and beyond.

Case 2: Innovation in Bronze Casting

Case two, on the other hand is an example of innovation at grassroots handed down by tradition through the bronze casting lineage of Benin. The innovation results in bronze products that exhibit a mastery of intricate designs and 'local engineering'. Knowledge and skills acquisition is similar to those described in Case 1 – through informal sources. The innovative bronze products are in most situations developed jointly by individuals, unattached professionals, cooperatives and NGOs. As the production practices involved require long hours of work in very high temperatures, they led to high levels of physical exertion. The innovation observed is therefore in methods – in areas such as new production practices, new organisational arrangements and new tools.

¹¹ For in-depth discussions and analyses of these cases, see Siyanbola et al. (2012).

Case 3: Innovation in Leather Tanning

Case three, which deals with Leather tanning is predominant in Northern Nigeria. Similar to cases 1 and 2, it is community-based. Drawing from family tradition, knowledge transfer is by informal learning (oral instruction and apprenticeship). However, highly evolved and systematic, it now supports advanced technologies with linkage to two federal research institutes – National Research Institute for Chemical Technology (NARICT) and the Federal College of Chemical and Leather Technology (CHELTECH) Nigeria. This is, therefore, an example of innovation at grassroots by partnership (as explained earlier) that is developed jointly by individuals in the informal sector working with the formal sector. The innovation in this case is a service model that results in greater accessibility, availability and affordability of leather products, hitherto highly expensive.

The recurrent challenges for the three cases include dearth of raw materials, product quality and customisations, management of the innovation communities, capability development, funding and obsolete production processes. FMST (2010) provide more examples of innovation at grassroots from Nigeria. As I show in the next section, the three country cases help illuminate our understanding of innovation at grassroots in Nigeria. They also highlight the roles that appropriate policies may play in supporting identified innovation at grassroots in Nigeria and other DCs. Furthermore, these cases provide insight on the status of knowledge sharing and diffusion amongst the grassroots innovators, and with the formal system. The cases indicate that while knowledge sharing and diffusion occurs amongst the local innovators, albeit weak; it does not exist between grassroots innovators and the formal system.

POLICY SUPPORT FOR INNOVATION AT GRASSROOTS

Discussions of the three cases above shed light on some areas where government public policies¹² may help in supporting innovation at grassroots. The findings of this paper are in line with Gupta (2013), who advocates the importance of policy support in order to bridge gaps in the promotion of innovation at grassroots. Some of the aspects of policy support and intervention, based on the country cases described in this paper include:

Fostering collaborations

One of the challenges evident from the three cases described in this paper is the importance, need, and opportunities in partnerships, fostering collaborations between local people and companies in the development of the innovative products, services and local solutions. Policy

¹² In this paper, I focus on Science, Technology and especially, Innovation (STI) policies as these are more relevant to the cases described; while acknowledging the importance of other government public (economic, finance, development, etc.) policies in supporting innovation at grassroots.

support in this area may also extend to include blending of formal and informal knowledge, science and sectors (Gupta, 1999) in public policy – for example, in the adaptation, diffusion, scaling up and commercialisation of products where applicable. Appropriate government policies may help link for example, business, economic, legal, S&T sectors and support innovation at grassroots, for instance by engaging intermediaries and knowledge brokers and bridging gaps.

Build capabilities

Policy support is also necessary for further development of the capabilities¹³ of the local innovation practitioners (e.g. the local pottery, bronze casting or leather tanning). Building capacities and mechanisms (frameworks) for mapping, scouting, documentation, database development and dissemination of innovation at grassroots is critical in order to ensure that the innovation remains inclusive, continues to create wealth for the local innovators and contributes to sustainable development. In Case 3 for instance, although the two formal institutions are located within the leather-tanning cluster, active engagement between the tertiary institutions and the local practitioners was still a challenge. Policy intervention may help support the “codification of knowledge, standardizing procedures, improving the innovation processes and facilitating knowledge transfer” (Siyabola et al., 2012, p.73) through the informal channels.

One reason why policy support for innovation at grassroots is identified to be weak in Nigeria is that policymakers still lack clarity on the concept due to improper communication. The implication is that it is less likely for national STI policies to support innovation at grassroots initiatives for example, by helping to provide some of the framework conditions (enabling environment). This paper suggests that a possible strategy to deal with this challenge is by building capabilities of local innovators in areas such as communication, stakeholder engagement and consultation. Such capabilities will help facilitate policy support that enables the development and implementation of a framework that better clarifies to NSI actors and stakeholders (i.e. regulators, policymakers, industry, academia, etc) what

innovation at grassroots is, how it may be captured, and its role in fostering SD (Gupta, 1999; Siyanbola et al., 2012; Smith et al., 2014).

Strengthening NSI

Another way government policy support may help boost innovation at grassroots is in strengthening the NSI. A more dynamic NSI would ensure that innovation from grassroots is more adequately catered for in DCs NSI. In India, for instance, where such activities have been practised and researched over the last two to three decades, resulting in

¹³ Necessary organisational processes and routines, individual training and skills upgrades.

better documentation and awareness, the concept is better articulated in the nation's NSI. This is not yet the case in Nigeria where for example, neither the recently formulated national STI policy of 2012 (FMST, 2012) nor the nation's NSI stipulates clear policy measures and instruments targeted at the development and promotion of innovation at grassroots. As in most other DCs, weaknesses in Nigeria's NSI are well-documented, resulting in poor collaboration amongst the actors (Oyewale et al., 2013). Government policy support geared towards strengthening the NSI may help clarify the role of actors and institutions in promoting, facilitating, shaping and enhancing the potential gains of innovation at grassroots towards addressing local needs and contributing to national development.

Policymaking and stakeholders engagement

Empirical data from Nigeria suggests that innovation at grassroots stakeholders are rarely included in government policymaking¹⁴ for example, in agenda setting or stakeholders' consultations. A study on the policy processes involved in the formulation of Nigeria's 2012 national STI policy revealed that local innovators and entrepreneurs at grassroots level were excluded in agenda setting¹⁵ and stakeholders' engagement – two of the most important stages of the policymaking (Daniels, forthcoming). The data also revealed that innovators and entrepreneurs at grassroots level did not participate in innovation policy problem definition or in deciding on which of the identified problems were priorities. Some of the reasons identified in the research as to why inadequate stakeholders' engagement has persisted in Nigeria, include tight agenda control by government policymakers, poor actor-network mapping and the insistence on a linear model of policymaking which sees the government as the sole policymaker while 'others' are confined to policy implementation. This is in line with the work of authors (see e.g. Harriss-White and Rodrigo, 2013) who observed that when sources of innovation idea generation are considered, often, grassroots communities possessing valuable traditional and local knowledge are ignored. Improved engagement of innovators and entrepreneurs at grassroots level is key to addressing this problem.

Knowledge sharing and diffusion and application of S&T

Another area where policy intervention may be needed is in strengthening knowledge-sharing and diffusion amongst the grassroots innovators and also with the formal system. Policy support may also help in the transfer and application of advancements in modern S&T to innovators at grassroots. S&T can provide technical support bases, aid experimentation of

¹⁴ Specific reference here to policy formulation and implementation as opposed to policy monitoring, evaluation and others policy stages, phases and processes involved in policymaking.

¹⁵ Include policymaking processes such as setting of policy priorities, selecting a policy course, deciding on policy instruments, constructing policy alternatives and developing policy strategies.

new ideas by local people, enhance creativity and entrepreneurship and potentially boost profitability.

Others – funding, infrastructure, IPRs, facilities...

Policy intervention may also help in promoting public awareness on the plight of actors at grassroots level and therefore contribute in various ways, such as in attracting financial support from government and industry sources, protection of Intellectual Property Rights (IPRs) of local innovators and in the provision of additional facilities (such as raw materials) and infrastructure (electricity, water, etc.). In the three cases examined, infrastructure deficiencies were observed in areas such as reliable energy, land and water supply and the need for raw materials substitutes. Innovators at grassroots level may also benefit from government policies that ensures a level field during partnerships and collaborations between local people and companies, enhance growth opportunities, improve export potentials and international trade beyond national boundaries and so on. Policies may also help ensure that innovation at grassroots from informal economy is better linked through supply chains to diffusion, distribution and consumption processes, with different stages of production and distribution systems interconnected (Harriss-White and Rodrigo, 2013).

CONCLUDING REMARKS

In this paper, I have focused on innovation at grassroots and defined it as: innovation that may be developed jointly by NGOs, formal sector or individuals in the informal sector or unattached professionals, companies in collaboration with local people. I have distinguished this from other categories – innovation from grassroots, innovation for grassroots and innovation by grassroots. Using three country cases, I illustrated innovation at grassroots in Nigeria's context, and as in other DCs and explained that they present important opportunities for addressing local problems.

In spite of the potential of innovation at grassroots to help address local problems and contribute to sustainable economic development, I argued that government policy support for innovation at grassroots is still weak and in some cases non-existent. Building on existing literature and the cases examined, I explained in what ways appropriate government policies might help support innovation at grassroots. This include areas such as, capability development, inclusion in NSI and policymaking, funding, protection of local innovators IPRs, provision of facilities and infrastructure, effective stakeholder's engagement during partnerships and collaborations between local people and companies.

With Nigeria and Africa's projected population increase in the next three decades, the challenge of job creation, economic growth, inclusive and sustainable development is heightened. More efficient policy support for innovation at grassroots may help ensure

better engagement of NSI actors with innovators at grassroots level, improvements in the necessary framework conditions and greater contributions to development. A new research agenda is therefore required in order to develop the policy instruments and frameworks needed to deal with these issues. Despite the unresolved questions, the potential benefits of strategic policy intervention in supporting innovation at grassroots far out-weighs the challenges embarking on such initiatives and therefore provides a justification for increased efforts in this area. This paper contributes towards further research and debate on the importance of having effective public (STI) policies that support innovation activities at grassroots in place and by so doing, address societal problems within social contexts.

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BIOGRAPHICAL NOTES

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