

CHANGING THE PRESENT AND CREATING THE FUTURE THROUGH INDIGENOUS KNOWLEDGE AND ENTREPRENEURSHIP

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ABSTRACT

The importance of entrepreneurship has become the major topic of discussion at all levels. However, little has been written about indigenous entrepreneurs, who apply indigenous knowledge in their entrepreneurial process. This paper highlights how this indigenous knowledge can be used to impact the present and influence the future, while achieving sustainable development. A review of relevant literature reveals that the position of entrepreneurship as a panacea for socio-economic problems falls within the purview of sustainable entrepreneurship. Within this growing body of knowledge, the question of how the role of entrepreneurship in solving socio-economic problems may unfold calls for answers. This paper fills this gap by providing empirical evidence of how entrepreneurship, in the form of indigenous entrepreneurship can contribute to solving socio-economic problems in society. Ideational bricolage and resource based view theories are applied to support the key arguments in the paper. The results of this study contribute to extant literature on indigenous and sustainable entrepreneurship. The paper also provides implications for practice as it reveals alternative cost-effective and environmentally friendly indigenous solutions that are relevant to contemporary society. Given that several indigenous knowledge solutions have been found to be valuable, this study encourages research into indigenous knowledge entrepreneurship as a means to leverage on successful indigenous practices, to inform mainstream practices and solutions and create a new generation of enhanced, cost-effective solutions.

Key words: Indigenous, Indigenous Knowledge, Indigenous Innovation, Ecosystem, Mainstream Innovation, Sustainable, Effective, Indigenous Entrepreneurship, Sustainable Entrepreneurship.

“The world will not evolve past its current state of crisis by using the same thing that created the situation” Albert Einstein

INTRODUCTION

Entrepreneurship has become the mainstay of both developed and developing economies. And attention has been given to entrepreneurship drive by various governments all over the world. This study highlights how indigenous knowledge entrepreneurship (IKE), which refers to entrepreneurship, based on the application of indigenous knowledge, provides valuable alternative solutions to contemporary society and can therefore be used to change the present and create the future. The paper uses two case studies to illustrate how indigenous knowledge can provide a basis for creating cost-effective solutions for contemporary problems in more environmentally friendly and sustainable ways. The conversation on the subject of indigenous entrepreneurship (IE) and its relevance in mainstream entrepreneurship

literature lie mostly within the purview of sustainable entrepreneurship. Sustainable entrepreneurship is the intersection of sustainable development and entrepreneurship, (Hall, Daneke, & Lenox 2010). This paper contributes to the burgeoning literature on sustainable entrepreneurship, a concept, which has emerged since entrepreneurial actions have been found to solve economic, social and environmental problems (Shepherd & Patzelt 2011). Recent studies have explored the process of developing sustainable entrepreneurship (Muñoz & Dimov 2015) and this has led entrepreneurship to be recognized as the channel for moving towards sustainable products and processes (Hall Daneke & Lenox 2010). Despite these important contributions to the literature, the questions about the nature of entrepreneurship's role and how it may emerge has remained partly unanswered. There is also need to further understand how entrepreneurs discover and develop opportunities that are outside the grip of extant markets (Hall Daneke, & Lenox 2010). In another light, Shepherd and Patzelt (2011) call for studies that support and promote environmentally friendly and community-based institutions. To fill these gaps, this study explores and encourages an appreciation of other forms of entrepreneurial knowledge and practices distinct from the more prevalent mainstream practices. The paper focuses on indigenous knowledge, as a rich source of entrepreneurial solutions that can transform society, by providing effective alternative solutions that are more affordable and environmentally friendly. Knowledge of nature is not restricted to modern science. Other communities around the world have rich experiences and accumulated knowledge that have enabled them develop explanations of their environments and means to overcome living challenges in sustainable ways (Director General of United Nations Educational, Scientific and Cultural Organisation [UNESCO], Federico Mayor, 1994. According to Onwuegbuzie (2014) most of this knowledge is indigenous to communities around the world and have been relegated to the background as modern science and technology progress. This knowledge however remains very relevant and valuable, and may be combined with modern scientific knowledge to produce the next generation of cost-effective solutions (Onwuegbuzie 2016). For instance, a number of Nigerian herbs have been discovered to provide cures to ailments such as diabetes and hypertension (Odukoya et al. 2005), which are typically expensive to treat the conventional way. The future availability of cost-effective solutions that can replace traditionally high-cost mainstream solutions will be a welcome development, especially as the global economic crisis beckons for more affordable solutions. Given the potential of indigenous knowledge principles to provide such solutions, it is imperative to leverage this valuable knowledge to create a future with more affordable alternatives for the benefit of humanity, especially in terms of health care. This paper is divided into seven sections. Section one deals with the introduction and presents a general overview of the topic explored. Section two discusses the subject of indigenous knowledge entrepreneurship, its definition, and dominant perspectives found in the literature. To provide a systematic flow of the key arguments in this paper, section three provides the theories adopted by the authors to explore the actions of indigenous entrepreneurs, and a diagram is used to provide a framework to illustrate the process discussed. Section four describes the methodology used in the paper and section five presents case studies on two indigenous entrepreneurs. In section six, data from case studies used in the paper are analysed, while section seven concludes the paper with recommendations to government, policy makers, academics and practitioners.

REVIEW OF RELATED LITERATURES

In this study, indigenous knowledge entrepreneurs (IKEs) are referred to as those who apply indigenous knowledge in their entrepreneurial process (Onwuegbuzie, 2014). The indigenous knowledge (IK) these entrepreneurs apply, refers to local knowledge that is unique

to a given culture or community and is usually transmitted orally through stories or apprenticeship (Onwuegbuzie, 2014). IKEs operate mostly in rural areas and tend to belong to low-income groups. In spite of operating in the least enabling environments, as most facilities provided by governments tend to be centred in cities, these entrepreneurs have continued to operate for decades, albeit on a small scale. Further, their solutions, no matter how effective, usually do not scale and are not available to wider markets. IKEs are consequently inclined to generate low cost solutions because the buyers in their communities are low-income like them and cannot afford expensive solutions. Nevertheless, the solutions they generate are sometimes just as effective as or even more effective than mainstream solutions (Srinivas & Sutz 2008). Indigenous knowledge principles could therefore inform western or mainstream knowledge systems, to develop low-cost and even more effective solutions which could impact the way society currently operates and influence future operations. While mainstream high-tech solutions continue to meet market acceptance especially in high-income societies, a greater proportion of the global population seek more affordable solutions. It is thus worthwhile to pay attention to useful sources of cost-effective innovations such as indigenous knowledge which can provide ingenious ways of lowering costs while proffering effective solutions to problems. Furthermore, indigenous peoples tend to depend on nature and have a deep knowledge of ecosystems, they use natural resources in a sustainable way and their solutions tend to be environmentally friendly (Grenier 1998; Sen 2005; Subba Rao 2006; Warren & Rajasekaran 1993). Consequently, indigenous knowledge also provides an opportunity to develop more environmentally friendly solutions, while propelling the attainment of sustainable development given that the inputs required tend to be locally available rather than imported. Considering the overall benefits that can be derived from indigenous knowledge solutions, this study attempts to provide a deeper understanding of indigenous entrepreneurship, which involves the application of indigenous knowledge. It also discusses how indigenous entrepreneurs can work together with mainstream technology to impact the present and influence a future that is more ecosystems friendly and provides more cost-effective solutions.

OVERVIEW OF INDIGENOUS ENTREPRENEURSHIP

Indigenous knowledge entrepreneurs (IKEs) are also referred to as grassroots innovators (Gupta et al. 2003; Srinivas & Sutz 2008). In this study, we refer to indigenous knowledge entrepreneurs (IKEs) as those who apply indigenous knowledge in their entrepreneurial process (Onwuegbuzie 2014). Similarly, Dana and Anderson (2007), define indigenous entrepreneurship (IE), as “self-employment based on indigenous knowledge” (p 4). This definition is based on the fact that being embedded in the context in which they operate, IEs acquire knowledge of resources that could lead to innovative solutions (Ganguli 2000). Cahn (2008) further defines indigenous entrepreneurship as entrepreneurship embedded in a unique socio-cultural context. Considering the similarity between the definition of indigenous knowledge entrepreneurs (IKEs) and indigenous entrepreneurs (IEs), both terminologies will be used interchangeably in this paper. Although indigenous entrepreneurs may be found in both developed and developing countries, they form a more significant proportion of the population in developing countries (Gupta et al. 2003; Subba Rao 2006). Most IKEs operate in the informal sector of the economy and in rural communities and are inspired by the unresolved problems in their communities whose solutions are either inexistent, unaffordable or not appropriate to solve their problems (Gupta et al. 2003; Srinivas & Sutz 2008; Verma, Tsephal & Jose 2004). They are also driven by an ideological commitment to the preservation of their heritage (Lindsay 2005). Though IKEs consider both

social and economic goals (Lindsay 2005), they are more focused on meeting the social and environmental needs not met by mainstream markets (Monaghan 2009; Srinivas and Sutz 2008), than on the commercialisation of their creative solutions (Gupta et al. 2003). They usually operate under conditions of scarcity (Gupta et al. 2003; Srinivas & Sutz 2008) and are motivated by the need for survival (Gupta et al. 2003; Sen 2005). They can thus be described as necessity-driven entrepreneurs (Bosma, Acs, Autio, Coduras & Levie 2009). Necessity-driven entrepreneurship is strongly related to economic growth (Frese & Friedrich 2002). Consequently, IKEs who are necessity-driven have the potential to contribute significantly to economic development if capital and entrepreneurial support are provided through appropriate institutional support (Gupta, 1999; Gupta et al. 2003).

PERSPECTIVES ON INDIGENOUS ENTREPRENEURSHIP

The subject of indigenous entrepreneurship or indigenous knowledge entrepreneurship is an emerging area in the entrepreneurship literature. Studies on indigenous entrepreneurship that have been captured in entrepreneurship journals can be grouped around the following themes:

- A. Culture and indigenous entrepreneurs:** The focus of literature in this domain is on the influences of culture on IEs and how these characteristics affect their process of opportunity recognition and exploitation (Lindsay 2005; Dana 2007; Clydesdale 2007; Cahn 2008; Peredo, Anderson, Galbraith, Honig & Dana 2004). IEs are said to discover opportunities based on their understanding of the ecosystem in which they live, which is often governed by cultural perceptions (Cahn 2008). The heterogeneity of the indigenous people and their cultural values often differ from the main ideas obtainable in non-indigenous entrepreneurship. While mainstream entrepreneurship seeks mainly financial gains, indigenous entrepreneurship, in addition to financial benefits also seeks non-financial gains and other social values (Dana & Anderson 2007; Peredo and Anderson 2006).
- B. Type of entrepreneurial ventures and values delivered by indigenous entrepreneurs:** IEs often create ventures that serve the needs of the community (Gupta 2001a; Cahn 2008; Butkeviciene 2009). One of the ways that indigenous entrepreneurship differs from other categories of entrepreneurship is in the kinds of goals and results that indigenous enterprises pursue. These goals are oriented towards the community and not individuals (Peredo & Anderson 2006; Gray, Duncan, Kirkwood & Walton 2014). In addition, the enterprises created by indigenous entrepreneurs tend to be environmentally sustainable (Dana & Anderson 2007).

As reported in other collections of literature, indigenous entrepreneurs apply knowledge that is unique, local or traditional. The tacit knowledge that indigenous people acquire by oral tradition is often transmitted from one generation to the next (Gupta 2001a; Sen 2005). It is made up of the skills, experiences and insights of people and is applied to maintain or improve their livelihood (Subba Rao 2006, 224). It originates from trial and error rather than theory and tends to be retained within particular communities, because it is deeply embedded in the culture of the community in which it originates. The knowledge acquired by indigenous entrepreneurs is used to craft grassroots innovations, which are discussed in detail in the next section.

In this paper, we argue that indigenous innovations do not only benefit indigenous people but the entire society. This view is also supported by McGregor (2004). Indigenous innovation, in addition to being useful to indigenous people, can help transform current production processes and also help to create sustainable alternative solutions that will shape future production processes. Some other authors (Galbraith, Rodriguez & Stiles 2006) however, do not agree that indigenous people through their enterprises, have a concerted commitment towards sustaining the environment, hence, they argue that indigenous people only act with caution when they perceive that the resources within their reach has become limited and scarce. Despite these arguments, we provide empirical evidence that supports the fact that innovations by IEs are cost effective and sustainable. This extended reasoning on the usefulness of indigenous knowledge and innovation is explained in the following section.

THEORETICAL FRAMEWORK

Bricolage theory and effectuation theory are set as a theoretical underpinning for this paper.

Bricolage theory: This was first introduced by Levi Strauss in 1967. “*Bricolage*” is a term used to describe the creative ways available resources are used (Senyard 2011). Baker and Nelson (2005, 333) define bricolage as combining available resources to solve problems and create opportunities, while also making a living from the process. Within this theory, the concept of ideational bricolage, is identified by Baker (2007), as the process whereby members of different societies recombine aspects of older myths to create new myths with different uses. Similarly, IEs, operate in their socio-cultural contexts based on knowledge passed on from one generation to the next. This knowledge is usually transmitted orally and represents an accumulation of several years of experience based on observations, experiences the adaptive skills of several generations of people in a community (Grenier, 1998; Warren & Rajasekaran, 1993). The indigenous knowledge acquired, thus provides a basis for local experimentation and innovations (Warren & Rajasekaran, 1993). Through knowledge derived from their local environment and from older generations that have survived through decades of harsh weather conditions, IEs possess knowledge that can contribute to solving problems such as climate change, environmental degradation, social exclusion and poverty etc. Embeddedness in their communities gives them access to valuable resources and insights that are useful to solving these problems, if their ideas and solutions are fostered and developed. Unfortunately, solutions by indigenous entrepreneurs tend to remain at micro-scale levels because the entrepreneurs lack the funds and/or the commercial knowledge to commercialise them beyond micro levels (Gupta et al. 2003). This paper therefore argues for the need to pay closer attention to the solutions by IEs, in order to find ways to apply them in contemporary society. It also advocates that one way to enjoy the benefits of indigenous innovation and mainstream innovation is to encourage the integration of both forms of knowledge as a means to develop new solutions. The specific cases used in this paper further provide support for the argument about indigenous entrepreneurs and the role they play in sustainable development through entrepreneurship.

EFFECTUATION THEORY

This is associated with entrepreneurship in resource-constrained contexts (Sarasvathy 2001; Sarasvathy & Dew 2005). “Effectuation processes take a set of means as given and focuses on selecting between possible effects that can be created with that set of means” (Sarasvathy 2001, 245). The logic considers the long-term result as unpredictable, as outcomes are achieved based on the actions of the entrepreneur and contingencies in the

environment in which they operate (Sarasvathy 2001; Sarasvathy & Dew 2005). Effectuation may thus be considered to be problem-driven experiments, such that the actor or entrepreneur sets out to solve a problem, using available resources, but is not clear what the final outcome would be, except that he intends to create a solution through experimentation. This way of acting describes how IEs, who usually unable to afford conventional solutions, seek affordable alternative solutions, by experimenting with the resources available to them.

Though IEs tend to be economically poor and with little or no formal education (Srinivas & Sutz 2008), they are however rich in traditional or indigenous knowledge, which helps them generate innovative solutions to their problems (Gupta et al. 2003). The innovations are generated from resources that abound in their environment (Ganguli 2000; Gupta et al. 2003). These innovations which tend to be simple and rudimentary are effective (Monaghan 2009; Subba Rao 2006). Indigenous innovation and entrepreneurship could therefore be an answer to the call for sustainable business processes. This suggests that the heterogeneous resources and knowledge possessed by indigenous people constitute a competitive advantage for firms that are able to harness them. Further, indigenous knowledge innovations, which are currently not as extensively exploited as other mainstream sources of innovations could provide a unique source of competitive advantage to mainstream organisations and innovators. As pointed out by some authors, it is the uniqueness of a firm's bundle of resources that provides a competitive advantage (Alvarez & Busenitz 2001; Su et al. 2009). Collaborations between grassroots and mainstream innovators may thus enable mainstream innovators tap into the possibilities provided by indigenous knowledge (Onwuegbuzie 2014). However, for this to happen, mainstream innovators need to recognise and value the opportunities grassroots innovations represent. Effectuation theory provides some insight into understanding the action of IEs that lead to the creation of grassroots solutions that are relevant to contemporary society, but have been ignored for decades.

ILLUSTRATIVE MODEL

Figure 1, below shows the flow of the argument proposed by this paper. The essence of this model is to illustrate the invaluable qualities of indigenous knowledge and innovation and how it can affect current production patterns and therefore, influence the future. The model has three domains; the first represents the cultural characteristic of indigenous entrepreneurs. As mentioned earlier, IEs are embedded in socio-cultural contexts that allow them pursue certain goals and values rather than others. Culture plays a role in the process of opportunity recognition and exploitation (Lindsay 2005; Dana 2007; Clydesdale 2007; Cahn 2008; Peredo, Anderson, Galbraith, Honig & Dana 2004). The second domain (type of ventures created by IEs (Innovative Community oriented enterprises), emphasises that IEs are more involved in their community and generally take actions and decisions that preserve their community and its resources. In these communities, the business and economic activities are rooted in culture and social perspectives. The third component of the model refers to how IEs can change current productions models and influence future production patterns, using their indigenous knowledge to create grassroots innovations. These innovations are facilitated by the knowledge passed down to IEs through the traditional means.

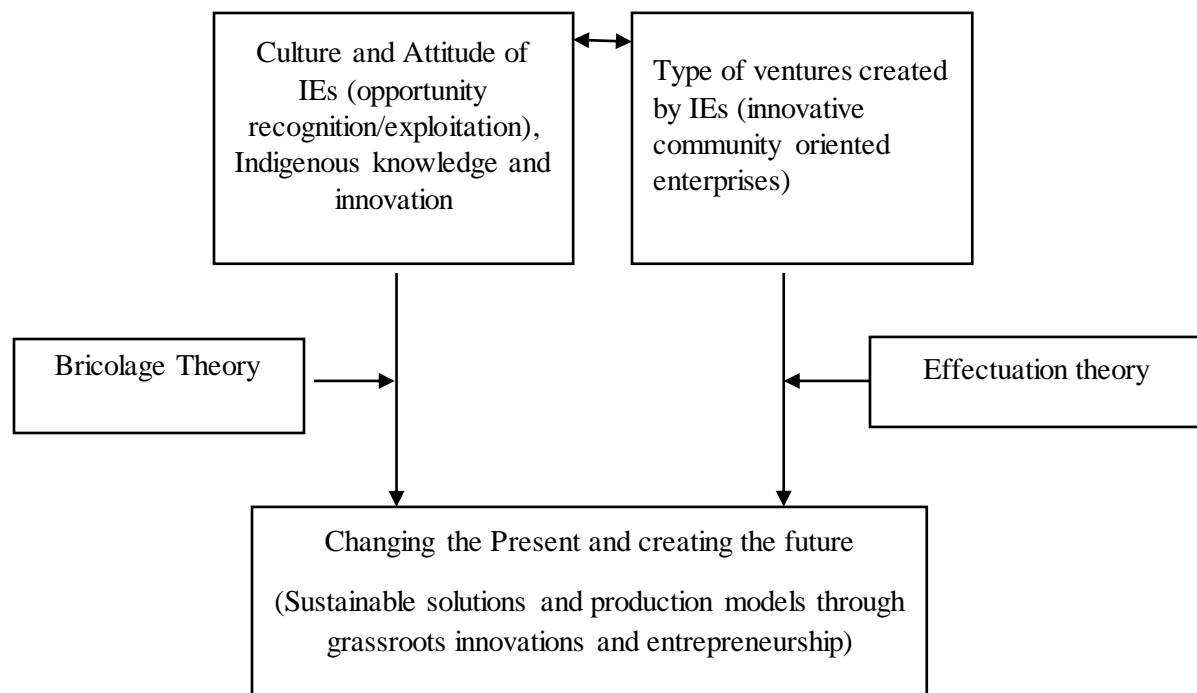


FIGURE 1
HOW IES GENERATE SUSTAINABLE, AFFORDABLE SOLUTIONS SOURCE:
HALL, ET AL., (2010).

Grassroots innovations (GIs) generated by IEs are defined as simple, need-oriented innovations created to address problems faced by indigenous communities. They also have the potential to provide solutions to contemporary problems (Gupta 2001a). GIs can however, also be generated by other individuals educated in formal systems and from higher income sectors, who are embedded to some extent in indigenous communities (Subba Rao 2006). Because grassroots innovations are generated by indigenous entrepreneurs and aimed at solving problems that are yet to be resolved or satisfy needs not met by wider markets or major institutions (Butkeviciene 2009; Srinivas & Sutz 2008), they can be considered as bottom-up innovations developed by rural communities (Butkeviciene 2009). They have a social impact because they provide affordable solutions to human needs and thus foster social inclusion and empowerment (Butkeviciene 2009). Though grassroots innovations are not always able to address all the problems in their environment and some of their solutions are sometimes inadequate (Gupta 2000), some low-cost grassroots innovations are more effective than conventional mainstream solutions (Gupta 1995; Gupta 2000). Some cited examples include; ways in which indigenous people conserve potable water in arid, drought prone areas, unique ecosystem friendly solutions developed by farmers for controlling pests as well as diseases in crops and livestock, and their ways of conserving aquatic and terrestrial biodiversity as well as soil conservation (Gupta 1995). Thousands of grassroots innovations, which are currently being documented, are known to have solved hitherto unresolved problems especially in local and rural communities (Gupta et al. 2003; Subba Rao 2006).

They have also provided low-cost alternative solutions to other markets (Mashelkar 2001; Pathak 2008; Verma, Tsephal & Jose 2004). Other examples of these cost-effective, low-tech yet highly effective innovations include motorcycle driven ploughs, mobile flourmills and bicycle sprayers for watering small farms (Pictorial illustrations of such innovations can be viewed in www.west.gian.org). Grassroots innovations tend to be effective because they are generated by those who have first-hand experience of the problems they resolve (Butkeviciene 2009; Gupta et al. 2003; Srinivas and Sutz 2008; Subba Rao 2006; Verma et al. 2004). This suggests that grassroots innovations have an in-built bias for effectiveness because they are need-generated and need-oriented. In recent years however, the growing interest in grassroots innovations among scholars has been driven by the recognition of their potential to provide effective solutions to problems and contribute to sustainable economic development (Ganguli 2000; Monaghan 2009; Sen 2005; Seyfang and Smith 2007; Srinivas & Sutz 2008). Furthermore, there is an increasing realisation that sustainable development is best achieved by building on existing local knowledge systems (Douthwaite 2006; Gupta et al. 2003; Monaghan 2009; Sen 2005). Consequently, this paper aims to highlight the importance of fostering and developing indigenous entrepreneurship, which generates indigenous knowledge solutions. These solutions are not only a means of developing a new generation of alternative affordable and sustainable solutions, but also a path to achieving sustainable development for the countries from which these solutions originate. If the countries, from which these solutions originate, foster the global commercialisation and dissemination of these solutions, the economic impact can lead to significant inclusive economic growth.

METHODOLOGY AND METHODS

A qualitative empirical research design was applied in this paper, specifically the use of case studies. This method was chosen as appropriate to illustrate how indigenous entrepreneurs go about creating commercializable solutions to problems in their environment, and how they exploit opportunities beyond the grip of existing markets. This exploration seeks to illustrate how IE's operate and how they can change the current practices by providing more environmentally friendly alternative solutions. Curran and Blackburn (2001), suggest that qualitative methods are most suited for studies that seek to explore a process. More so, our research objective is more related to understanding a phenomenon rather than measuring that phenomenon. The context of investigation is Nigeria. The country currently has a population of over 186 million people and a gross domestic product of 405.1 billion dollars (World Bank 2016). The country is also classified as a lower middle-income country and an emerging economy by the World Bank (See <http://www.worldbank.org/en/country/nigeria>). Research in the area of entrepreneurship in general and indigenous entrepreneurship in particular is said to be nascent in the African region (Bruton, Ahlstrom & Obloj 2008; Khavul, Bruton & Wood 2009). Therefore, the choice of Nigeria as a context of study contributes to the growing body of research on entrepreneurship in Africa. Semi-structured interviews and observation of two indigenous entrepreneurs based in Nigeria were used to provide information for the two case studies provided in this paper.

CASE STUDIES

This section provides two case studies on indigenous entrepreneurs, who deliver solutions in their communities.

Case I –Traditional Medicine Healer

The first case study features a traditional medicine healer, Mr Rufus Ote. He learnt the art through apprenticeship, working closely with his father, while growing up. He watched the latter collect and mix herbal remedies for different ailments presented by patients. He also assisted with chores, such as collecting, washing and grinding herbs picked from the forest. From watching his father, he also learnt the practice of trying out new combinations and thus, constantly explored new herbal solutions, beyond those learnt from his father. Ote took over from his father, after a brief stint as a factory worker in the city, where he migrated. Like every young rural dweller, he felt the city would offer him better economic opportunities. However, with little or no formal education, he found that the best he could get was a job as a factory hand. After months of living in squalor, when he started receiving calls to return home to replace his father who had passed on, it was not difficult to make up his mind to return to the village as he realised his father lived a better quality of life than he was experiencing in the city. The community welcomed Ote's return as their herbalist. They trusted his competence as they as they had watched him work alongside his father for several years and were indeed happy to see that their herbal healer had been replaced by his son. They would otherwise have had to travel to neighbouring communities for treatment. Ote successfully treated their ailments. One of Ote's patients was a 70-year-old man, who was hypertensive. He had been receiving treatment from Ote for years. He had this to say: *"Ote has been treating me for over 10 years. I take herbs from him and when I go to hospital to check my BP (blood pressure), they say I'm fine"*.

Ote was well known in the community and as he had learnt several tried and tested remedies from his father, he was able to treat people effectively. He however joined the association of herbal medicine healers that was made up of herbalists from neighbouring communities. He noted that this presented an opportunity for them to learn from each other and provide a wider range of remedies they could each offer their patients. In the face of rising costs of conventional mainstream medication, these herbal remedies were the affordable alternative for the rural poor. Ote himself, benefitted from this knowledge as sometimes he had to develop treatments for himself:

"When I had a rash I could not cure, I went to see a doctor. I could not afford the prescribed remedy, so I went home and experimented with different herbs until I got a potion that cured the rash. I now sell it to others".

On another occasion, Ote was compelled to develop a treatment for his diabetes when his supply of free conventional medication ceased. He was diabetic and had a friend who had the same condition. The friend had a son in the US, who regularly sent him medication to manage the condition. This friend shared the medication with Ote. Unfortunately, the friend died and so his son stopped sending the medication. Ote also could not afford the available conventional medication, so he turned to herbs, which were what he knew best. He worked on a combination of herbs he hoped would treat his condition and they did. On his usual check-up visit to the hospital after he started his local treatment, the nurse noted that his blood sugar level had improved significantly and asked what he had been taking in the past weeks. When he informed them that he was using local herbs, they pointed out that he was doing better than when he was taking modern medication and asked him to continue with the herbs, while maintaining his regular check-up. Ote has since continued to be the community herbalist in his village. Even though Ote does not have any form of formal education, he has been evolving the packaging of his herbal potions. These mixtures used to be packaged in leaves,

but over time, Ote's packaging has evolved to include paper, plastic and glass packaging. Ote's children have also been working with him, even though they also go to mainstream schools. They have also learnt the art and will likely take over from their father in future. It is also likely that the herbal solutions they produce will evolve from what they learnt from their father.

Case II – Wood Carver

The second case features a wood carver, Fatia. His father was also a wood carver and as was common in those days, Fatia and his siblings learnt the family trade by watching and working with their father. Their family was known to be the wood carvers of the community. Wooden carvings were frequently used to make furniture as well as symbolic mantles used for celebrations such as weddings, christenings, chieftaincy titles, religious rites and funerals. These celebrations were rather frequent in the community, and so demand for their goods and services was therefore high. Fatia had four sons. They worked with him and had become well-known wood carvers like him. Even though Fatia had no formal education, he carved with precision and could deliver intricate and elaborate carvings on wood. He boasted that his carvings lasted through all seasons and for many years, without getting warped because of the treatment he applied before carving. He had this to say:

“I don't buy commercially available wood treatments. I use the herbs my father taught me to treat wood and my results are superior to what you get from using Solignum from the market. My father showed me the herbs used for treating wood. I use them to treat the wood before I start carving. No matter the weather, the wood I treat with these herbs will remain intact”.

Over time, as more conventional wood treatment products got introduced to the rural areas, other wood carvers and carpenters gradually abandoned traditional wood treatment methods, which were more tedious. Fatia thus started losing some of the carpenters, who used to come to him to treat the wood they used for furniture or carving. The commercially available Solignum treatment though easier to apply, did not produce the same result as the traditional treatment as Fatia pointed out:

“My wood treatment is better than the Solignum people buy in the market. Once I apply my treatment, the wood remains in good condition in both dry and rainy season. With the other treatment, after some time, the wood starts to warp”.

Fatia's sons currently work with him. However, most of those who used to patronise Fatia for wood treatment, now use the commercially available mainstream products, so Fatia now has less customers. Consequently, Fatia explained that he is now on the lookout for wider markets that will value his quality of work and his carving skills.

CASE ANALYSIS

Both cases will be analysed through the lenses of bricolage and effectuation theories. Both theories posit the use of available resources in seeking to find solutions to identified problems. They also speak to the unpredictable nature of the outcome and thus allude to the use of experimentation in the process of arriving at a solution. The use of available resources suggests that sustainability is assured as the inputs are locally available. Availability also suggests sustainability, especially when the resources are used in a way that ensures they are

replenished. Affordability is also implied as IEs, tend to operate in resource-constrained contexts and because they are unable to afford conventional solutions, when such exist, they experiment with the resources available to them in their environment, to create affordable solutions that effectively meet their needs. Ideational bricolage also alludes to the type of knowledge applied. As discussed in the literature review, indigenous entrepreneurs apply indigenous knowledge that they acquire from older generations, both orally and by working closely with them. Consequently, the case study analysis will be done along the lines of: Type and source of knowledge applied, resource availability, cost-effectiveness, process, sustainability and environmental-friendliness. Regarding type of knowledge applied, both IEs applied the indigenous knowledge they inherited from their parents. In the first case, the entrepreneur learns about healing herbs from his father by working closely with him. Similarly, in the second case, the wood carver learns from his father, how to treat wood with herbs. He goes with his father to the forest and learns, which herbs are used to treat wood, before carving. This knowledge may also have been passed down to their parents through generations and continues to be valuable to date. Considering resource availability, both entrepreneurs, use available herbs in their environment. Most IEs tend to be micro-scale and not financially buoyant, they cannot afford expensive solutions. They therefore are naturally inclined to inexpensive solutions. Since the resources abound in their environment, they tend to be low-cost. Further, in both cases, the traditional indigenous solutions that deliver superior outcomes to conventional mainstream solutions albeit on a small scale. The solutions delivered are therefore cost-effective. Though there is a tendency to associate low-cost to low quality, indigenous knowledge solutions actually combine low-cost and high effectiveness, as the result they produce is superior to the conventional solutions. Regarding the process of generating these solutions, it was observed that for problems with known solutions, the IEs simply applied the solutions they had learned from their parents. However, in instances, where the problem to be solved varied from the known solution, we observe the entrepreneur; engage in experimentation, guided by previous knowledge. For instance, in the first case, when the IE has a rash he had never seen before and cannot afford the conventional solution available in the pharmacy, he embarks on experimentation. He tries different combinations of herbs, till he attains a combination that cures the rash. Similarly, when his supply of conventional diabetic treatment is no longer available, he tries different herbs, while checking his blood sugar. He eventually arrives at a solution that treats his condition better than the conventional solution. In terms of sustainability, because their operations are usually not on a large scale, the chances of exhausting the available resources are slim. However as noted by a number of authors, indigenous people rely heavily on nature, and so they instinctively act in ways that ensure natural resources they use are replenished. The processes of producing the solutions are also environmentally friendly. Consequently, in both instances, the indigenous treatments deliver more effective outcomes, in addition to being low-cost and more environmentally friendly. For instance, the incidence where Ote's hypertensive patient experiences tremendous improvement in his health after taking the traditional herbs, suggests the effectiveness and potential benefits of the innovations created by indigenous entrepreneurs. Similarly, the fact that Fatia's herbal wood treatment produces better and longer lasting effect on wood than the more conventional treatments, suggests that indigenous solutions are indeed very valuable even though they remain relatively unknown to wider markets. Both case studies thus illustrate solutions by IEs, that can inform the present mainstream solutions made available and create a future of alternative solutions that are both sustainable and affordable. Considering how valuable indigenous solutions such as these can be to wider populations, it is indeed worth exploring how such solutions can be scaled and subsequently disseminated for commercialisation. This genre of solutions tends to be known only to the aging segment of rural populations and therefore stand the risk of extinction. The

second challenge is that such solutions are not usually available in large quantities as they are usually generated through manual methods. Further, considering that the inputs for such solutions are locally available, they represent a competitive advantage to the country that originates such solutions.

DISCUSSION

Various aspects of bricolage and effectuation theories can be observed in both case studies as the solutions created are developed by experimenting with available resources. Using the ideational bricolage as a basis of analysis, the case subject learned the art of healing through his father; this knowledge would have been passed on from several generations even before Ote's father was born. Ote went further to advance the knowledge received through innovation, trying out other combinations to produce cures for new ailments that were presented. The process of effectuation can also be observed as available resources are tinkered to eventually produce an outcome that is not predetermined, but however solves the problem on hand. Fatia's learning experience also indicates the incidence of ideational bricolage. The invaluable experience he is currently applying in his business processes (wood carving) was passed down to him by his father. The herbs that he used to treat the wood he carved proved to be much better than the Solignum used by modern day wood carvers and carpenters. The wood treated using his process are better preserved and protected from weather changes. The use of these herbs provides another example of how indigenous knowledge and innovation can be used to change the present and create the future. The technique for preserving wood could be further improved through the use of modern mainstream technology. The advantages that these herbs have over the Solignum could be exploited by packaging the herbs in forms that are better preserved and packaged and therefore acceptable to wider markets. Both cases illustrate indigenous solutions that can change the present and create the future, by providing affordable, effective and environmentally-friendly alternatives to conventional solutions. Consequently, resuscitating and developing indigenous solutions, which have been ignored by wider markets for decades, can provide much needed cost-effective alternatives to wider populations. Features such as effectiveness, affordability, sustainability and environmental friendliness are qualities which should inform the next generation of solutions. Many indigenous solutions present these qualities, but usually fail to scale. To overcome this challenge, some mainstream technology may be applied to produce the volume of indigenous solutions required for wider markets. For instance, in the case studies featured above, all the processes used in preparing the solutions are manual. In the first case, Ote collects the leaves and blends them manually before packaging them for the customer. While this manual process was able to meet the demand size for his rural community which is much less in size than urban populations, some form of automation, will be required to meet higher volumes of demand. For such solutions to be disseminated to larger cities or even nationally or globally, modern production processes will need to be introduced. Consequently, a combination of indigenous innovation and mainstream technology could deliver higher volumes of indigenous solutions to meet the demand of wider markets and larger populations. Mainstream technology can be integrated in the process of generating indigenous solutions, through R&D and modern packaging and other standardization techniques will also be required.

CONCLUSION AND RECOMMENDATIONS

This paper has highlighted how indigenous knowledge and entrepreneurship can change the present and create the future, by providing solutions that are cost-effective, sustainable and environmentally friendly. As noted from the review of literature and from the

analysis of the cases provided, indigenous entrepreneurs have a deep knowledge of how to use available resources to create valuable solutions that are relevant to contemporary society. Bricolage and effectuation theories were used to explain the actions of indigenous entrepreneurs, who tinker with available resources to generate solutions they can afford. Indigenous people have accumulated knowledge transmitted through generations, about the environment and how to use available resources to solve problems in an environmentally friendly way. More attention needs to be paid to the valuable solutions they provide such that they can be developed, scaled and disseminated to wider markets. The resources and processes applied by indigenous entrepreneurs provide a source of ideas that can change current production methods and influence a new generation of solutions for the future. Modern methods that are flawed by expensive processes that are harmful to the environment and not sustainable can be abandoned for more cost-effective and environmentally friendly processes. In seeking to scale indigenous solutions however, some level of automation will be required. Consequently, future production methods will feature a combination of indigenous and mainstream systems. This integration will form a synergy that allows for scaling affordable solutions to be produced in a sustainable way, while the environment is preserved and protected. Based on the above, the authors recommend that government, policy makers and development workers need to foster R&D to encourage, disseminate and commercialise indigenous solutions, as they form a national competitive advantage and allow for inclusive growth. And academics also need to pay more attention to this category of entrepreneurs, who operate quite differently from mainstream entrepreneurs. The processes and principles they apply hold valuable lessons for modern society, with its expensive and sophisticated production methods. Principles from indigenous entrepreneurs, could simplify these processes while increasing their effectiveness. As seen from above, the benefits of researching indigenous entrepreneurs abound as they possess knowledge of solutions to problems such as climate change and naturally occurring health solutions. As Gupta et al. (2003), point out, time has come to reward indigenous people for the knowledge they share with scientists and researchers. As we seek to disseminate and commercialise valuable solutions we learn from them, they must be rewarded for their intellectual property and gift to the world.

LIMITATIONS AND FURTHER RESEARCH

This study has some limitations as with other research studies. The limitations lie in the fact that only a minute section out of a myriad of entrepreneurial activities were covered within the Nigerian setting, however, the researchers believe that while this processes within this study can be replicated, other methods can be used to discuss the multifarious indigenous micro entrepreneurial activities. Therefore, there is need for future researchers to look into these as it paves way for further studies.

ENDNOTES

1. Examples of grassroots innovations are that are cheaper and more effective than modern day technology are provided in the paper

REFERENCES

- Alvarez, S.A. & Busenitz, L.W (2001).“The entrepreneurship of resource-based theory.” *Journal of Management*, 27(6), 755-775.
- Baker, T. (2007). “Resources in Play: Bricolage in the Toy Store (Y).” *Journal of Business Venturing*, 22(5), 694-711.
- Baker, T. & Nelson, R.E.(2005).“Creating something from nothing: Resource construction through

- entrepreneurial bricolage." *Administrative Science Quarterly*, 50(3), 329-366.
- Bosma, N., Acs, Z., Autio, E., Coduras, A. & Levie, J. (2009). *Global Entrepreneurship Monitor: 2008 Executive Report*. Babson College, Universidad del Desarrollo. London Business School, Global Entrepreneurship Research Consortium (GERA).
- Bruton, G.D., Ahlstrom, D. & Obloj, K. (2008) "Entrepreneurship in Emerging Economies: Where are we today and where should the research go in the future." *Entrepreneurship: Theory and Practice*, 32(1), 1-14.
- Butkeviciene, E. (2009). "Social innovations in rural communities: Methodological framework and empirical evidence." *Social Sciences*, 1(63), 80-88.
- Cahn, M. (2008). "Indigenous entrepreneurship, culture and micro-enterprise in the pacific islands: Case studies from Samoa." *Entrepreneurship and Regional Development*, 20(1), 1-18.
- Clydesdale, G. (2007) "Cultural evolution and economic growth: New Zealand Maori." *Entrepreneurship and Regional Development*, 19(1), 49-68.
- Curran, J. & Blackburn, R.A. (2001). *Researching the small enterprise*. London: Sage.
- Dana, L.P (2007). *International Handbook of Research on Indigenous Entrepreneurship*. Cheltenham: Edward Elgar.
- Dana, L. & Anderson, R. (2007). *International Handbook of Indigenous Entrepreneurship*. Cheltenham: Edward Elgar.
- Douthwaite, B. (2006). "Enabling innovation: Technology-and system-level approaches that capitalize on complexity." *Innovations: Technology, Governance, Globalization*, 1(4), 93-110.
- Frese, M. & Friedrich, C. (2002). "From the editors of the special issue on entrepreneurship in africa." *Journal of Developmental Entrepreneurship*, 7(3),1-5.
- Galbraith, C., Rodriguez, C. & Stiles, C. (2006)."False myths and indigenous entrepreneurial strategies." *Journal of Small Business and Entrepreneurship*, 8(2), 1-20.
- Ganguli, P. (2000). "Intellectual property rights: Mothering innovations to markets." *World Patent Information*, 22(1-2),43-52.
- Gray, B.J., Duncan, S., Kirkwood J. & Walton. S. (2014). "Encouraging sustainable entrepreneurship in climate-threatened communities: A samoan case study." *Entrepreneurship and Regional Development*, 26(5-6), 401-430.
- Grenier, L. (1998). Working with indigenous knowledge: A guide for researchers. International Development Research Centre. Ottawa, ON, Canada.S
- Gupta, A. (1995). "People's knowledge for survival: grassroots innovations for sustainable natural resource management." Paper presented at the IFADs international conference on hunger and poverty, Brussels, November 16-23.
- Gupta, A. (1999). "Securing traditional knowledge and contemporary innovations: Can global trade links help grassroots innovations? honey bee perspective." Invited Paper for World Trade Forum, Bern, August 27-29.
- Gupta, A.K. (2000). "Grassroots innovations for survival." *LEISA, India*, 2(2), 20-21.
- Gupta, A. (2001). *Framework for Rewarding Indigenous Knowledge in Developing Countries: Value Chain for Grassroots Innovations*. WTO Expert Committee, 3.
- Gupta, A.K., Sinha, R., Koradia, D., Patel, R., Parmar, M., Rohit, P., Patel H., et al. (2003). "Mobilizing grassroots' technological innovations and traditional knowledge, values and institutions: Articulating Social and Ethical Capital." *Futures*, 35(9), 975-987.
- Hall, J.K., Daneke, G.A. & Lenox, M.J. (2010)."Sustainable development and entrepreneurship: Past contributions and future directions." *Journal of Business Venturing*, 25(5), 439-448.
- Lindsay, N. (2005). "Toward a cultural model of indigenous entrepreneurial attitude." *Academy of Marketing Science Review*, 5, 1-18.
- Mashelkar, R. (2001). The Indian innovation system. Development Outreach, World Bank, Washington, DC.
- McGregor, D. (2004). "Coming full circle: Indigenous knowledge, environment, and our future." *The American Indian Quarterly*, 28(3), 385-410.
- Monaghan, A. (2009). "Conceptual niche management of grassroots innovation for sustainability: The case of body disposal practices in the UK." *Technological Forecasting and Social Change*, 76(8), 1026-1043.
- Muñoz, P., & Dimov, D. (2015). "The call of the whole in understanding the development of sustainable ventures." *Journal of Business Venturing*, 30(4), 632-654.
- Odukoya, O.A., Olukemi, I.O., Oluwatoyin, S.M., Austin, A.O., Mansurat, L.B. & Olufunmilola, T.I. (2005). "Antioxidant Activity of Nigerian Dietary Species." *Electron. J Environ Agric Food Chem*, 4, 1086-1093.
- Onwuegbuzie, H.N. (2014) "The entrepreneurial learning process of indigenous knowledge entrepreneurs". Unpublished Ph.D. diss., Lancaster University Management School.
- Onwuegbuzie, H.N. (2016). A 21st Century paradigm for entrepreneurs and policy makers: Applying modern scientific methods to indigenous innovation, in J. Liddle (Eds.) *New Perspectives on Research, Policy & Practice in Public Entrepreneurship (Contemporary Issues in Entrepreneurship Research, Volume 6)*.

- Binkley: Emerald Group.
- Pathak, R. (2008). "Grass-root creativity, innovation, entrepreneurialism and poverty reduction." *International Journal of Entrepreneurship and Innovation Management*, 8(1), 87-98.
- Peredo, A.M., Anderson, R., Galbraith, B., Honig, B. & Dana, L.P. (2004). "Towards a theory of indigenous entrepreneurship." *International Journal of Entrepreneurship and Small Business*, 1 (1-2), 1-20.
- Sarasvathy, D.S. (2001). "Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency." *Academy of Management Review*, 26(2), 243-263.
- Sarasvathy, S.D. & Dew. N. (2005). "New market creation through transformation." *Journal of Evolutionary Economics*, 15(5), 533-565.
- Sen, B. (2005). "Indigenous knowledge for development: bringing research and practice together." *International Information and Library Review*, 37(4), 375-382.
- Senyard, J., Davidsson, P., Baker, T., & Steffens. P. (2011). "Resource constraints in innovation: The role of bricolage in new venture creation and firm development." paper presented at the 8th AGSE International Entrepreneurship Research Exchange, Melbourne, February 1-4.
- Seyfang, G. & Smith, A. (2007). "Grassroots innovations for sustainable development: Towards a new research and policy agenda." *Environmental Politics*, 16(4), 584-603.
- Shepherd, D.A. & Patzelt. H. (2011). "The new field of sustainable entrepreneurship: Studying entrepreneurial action linking 'what is to be sustained' with 'what is to be developed'". *Entrepreneurship Theory and Practice*, 35(1), 137-163.
- Srinivas, S. & Sutz, J. (2008). "Developing countries and innovation: Searching for a new analytical approach." *Technology in Society*, 30(2), 129-140.
- Su, S., Mei-Chi, L., & Huang, H.C. (2009). "Healthcare industry value creation and productivity measurement in an emerging economy." *The Service Industries Journal*, 29(7), 963-975.
- Subba Rao, S. (2006). "Indigenous knowledge organization: An Indian scenario." *International Journal of Information Management*, 26(3), 224-233.
- Verma, S., Tsephal, S. & Jose, T. (2004). "Pepsee Systems: Grassroots innovation under groundwater stress." *Water Policy*, 6(4), 303-318.
- Warren, D.M. (1992). Strengthening indigenous nigerian organizations and associations for rural development: The case of ara community. Niser occasional Paper No. 1. Ibadan: Nigerian Institute of Social and Economic Research.
- Warren, D.M., & Rajasekaran, B. (1993). "Putting local knowledge to good use." *International Agricultural Development*, 13(4), 8-10.