



Advocating the concept of agility in an innovation ecosystem for the creation and adopting of disruptive technologies in Africa: part 1 – review and methodology.

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Summary - Crynodeb

Innovation ecosystem is becoming the most prominent type of environment that is being recently built or nurtured to cope with the broader vision of fostering innovation to address many socio-economic issues. However, the process of building and managing an innovation ecosystem could be very complex resulting to a process of zigzagging and management complexity that could lead to sluggish response in a fast changing environment. Thus, this research aims at adopting the benefits of agility in the context of innovation ecosystem to enable the actors to create disruptive technologies. This research employs semi-structured interviews and observations within the sub-units of CEOs, managers, individuals, and specialists with relevant knowledge of the subject in the technology industry in London, UK and California, USA. The findings are expected to inform decisions on better performance of innovation ecosystem and to aid the proposal of a dynamic capability framework for creating and adopting disruptive technologies for value optimisation in Africa. Thus, the findings can be contextualised to analyse and address the situations in Africa in the context of innovation models as effective contributions to the growth and development efforts of the continent. This paper would be published in two series with this first phase focusing on the introduction, literature review and data collection. The second phase will cover research findings, which will be reviewed in conjunction of the literature review and the conclusion of the research, which will be contextualised in African context. The research is expected to produce impactful knowledge for advocating agile based innovation ecosystems as ground-breaking constructs that would facilitate co-creating culture among SMEs in African for the creation of produced capital (tools, technologies, intellectual property etc.) in the continent rather than relying heavily on the degenerating natural capital.

Mae ecosystemau arloesi'n datblygu i fod y math o amgylchedd mwyaf blaenllaw sy'n cael ei lunio neu'i feithrin yn ddiweddar i ymdopi â'r weledigaeth ehangach o feithrin arloesi er mwyn mynd i'r afael â llawer o faterion economaidd-gymdeithasol. Fodd bynnag, gallai proses llunio a rheoli ecosystem arloesi fod yn gymhleth iawn gan arwain at broses o igam-ogamu a chymhlethdod rheoli a allai arwain at ymateb arafaid i amgylchedd sy'n newid yn gyflym. Felly, nod yr ymchwil hwn yw mabwysiadu buddion ystwythder yng nghyd-destun ecosystemau arloesi er mwyn galluogi BBaChau i greu technolegau tarfol. Mae'r ymchwil hwn yn defnyddio cyfweiliadau lled-strwythuredig ac arsylwadau o fewn is-unedau Prif Swyddogion Gweithredol, rheolwyr, unigolion, ac arbenigwyr â gwybodaeth berthnasol am y pwnc yn y diwydiant technoleg yn Llundain, DG a Califfornia, UDA. Disgwylir i'r canfyddiadau hysbysu penderfyniadau ynghylch gwell perfformiad o ran ecosystemau arloesi a helpu i gynnig fframwaith galluogrwydd deinamig ar gyfer creu a mabwysiadu technolegau tarfol i optimeiddio gwerth yn Affrica. Byddai'r papur hwn yn cael ei gyhoeddi mewn dwy gyfres gyda'r cam cyntaf hwn yn canolbwyntio ar y cyflwyniad, adolygu'r llenyddiaeth a chasglu data. Bydd yr ail gam yn cwmpasu canfyddiadau ymchwil, a gaiff eu hadolygu ar y cyd â'r adolygiad llenyddiaeth, a chasgliadau'r ymchwil, a fydd yn cael ei osod o fewn cyd-destun Affricanaidd. Disgwylir i'r ymchwil greu gwybodaeth effeithiol ar gyfer hyrwyddo ecosystemau arloesi ystwyth fel lluniadau sy'n torri tir newydd ac a fyddai'n hwyluso creu diwylliant ar y cyd ymhlith BBaChau yn Affrica er mwyn creu cyfalaf a gynhyrchir (offer,

technologau, eiddo deallusol ac ati) ar y cyfandir yn hytrach na dibynnu'n drwm ar y cyfalaf naturiol sy'n dirywio.

Keywords: Innovation Ecosystem, Corporate Agility, Collective Functionality, Disruptive Technologies and Dynamic Capabilities.

Introduction

Recently, organizations and institutions are facing highly turbulent environments, with the effect of strong dynamism, complexity, and uncertainty, resulting to hypercompetitive market situations and intensive threats for firms' survival (Felipe et al., 2016). Responding to these situations, businesses, policy makers, universities and several professional institutions are promoting a compulsory agenda of fostering innovation as a coping mechanism for addressing several accompanied socio-economic, and ecological issues (OECD, 2010; Carayannis et al., 2012). Thus, the idea of innovation ecosystem is currently spreading across many developed countries as the mechanism for creating innovative solutions to socio-economic, and ecological issues. Hence, becoming the most prominent type of environment and cultural constructs under nurture to meet the broader vision of fostering innovation for combatting the challenges of a complex global community (Jackson, 2011).

However, the process of building and managing an innovation ecosystem construct could be very complex as it includes coping with several hard tangible and intangible issues of different nature, different levels and types of inter-dependences (Rabelo & Bernus, 2015). This is because an ecosystem construct involves different actors and stakeholders with different levels of maturity. Other factors that impose challenges to the success of innovation ecosystems, as further stressed by Rabelo & Bernus (2015), include weak initial strategy, insufficient general infrastructure, and limited resources, changes in the coordinating team, as well as changes in the environment. As a result of these factors, an ecosystem construct can develop into a process of zigzagging that creates management complexity, which can result in sluggish response to a fast changing environment.

On the other hand, agile concept is considered as a mechanism that would allow organizations to detect environmental changes and be able to adapt to the changes or facilitate proper response (Felipe et al., 2016). The response would enable the firm to remain relevant in the industry and gain the knowledge and capabilities that facilitate a greater success in the exploitation of opportunities that emerge with the changing environment. Hence, agile concept has been considered as a key success factor for the survival of firms and thriving in the uncertain and turbulent markets (Ganguly et al., 2009). However, the advantageous elements of agility remain underexplored in the management of innovation ecosystems. Hence, little is known on how innovation ecosystems can become agile for better performance.

Therefore, to extend the knowledge of agile practices in the context of innovation ecosystem, this research is proposing an agile innovation ecosystem construct that operates in such a way that could overcome the hurdles of the associated complexity to respond to changes faster than ever before. This means creating an agile system that would eliminate the complexity of the ecosystem and develop capabilities for a faster response to the competitive and challenging environment.

Rationale for the Research

The major rationale of this research is the need to promote the trend of innovation ecosystem construct or collaborative culture among SMEs in Africa as a strategic approach for addressing socio-economic problems in the continent. It is believed that innovation ecosystem construct will enable the generation of radical innovation, disruptive technologies, and the creation of new markets or emerging industries (Gomes et al., 2016) that can effectively respond to many societal and economic problems. The socio-economic problems include ethnic conflicts, political crisis, job shortage/unemployment, scarcity of resources, etc. Therefore, there is a strong need to facilitate a co-creating culture in Africa to address these problems especially as it concerns creating produced capital (tools, technologies, intellectual property, etc.) in the continent rather than relying heavily on the degenerating natural resources. However, while promoting such collaborative culture, the survival of the innovation ecosystem will require a high level of agility which involves the ability to be agile in sensing and developing opportunities that will enable the creation of innovations (Afuah & Tucci, 2003), facilitate faster response to disruptive events (Doz & Kosonen, 2010) and enhancing flexibility over external threats (Demil & Lecocq, 2010).

Aim and Objectives

This research aims at adopting the concept of agility in innovation ecosystem for the creation and adopting of disruptive technologies in Africa. The objectives include:

- a) To explore the trends in innovation ecosystems;
- b) To explore the benefits of agility;
- c) To explore the roles of agility in producing high-speed innovations within innovation ecosystems;
- d) To recommend the dynamic capability framework that would enable SMEs in Africa to create and adopt disruptive technologies using an innovation ecosystem model.

Literature Review

Innovation Ecosystem

Literatures of innovation ecosystems define it as a heterogeneous constellation of firms, which co-evolve capabilities in the co-creation of value (Adner & Kapoor, 2010; Autio & Thomas, 2014). According to Jackson (2011), it is complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation. In the view of Dedehayir et al. (2016), it is the collaborative effort of a diverse set of actors towards innovation development. Based on the above definitions, Gawer (2014) and Thomas & Autio (2013), refer innovation ecosystems as platforms for bringing providers of products and services together into exchange services with the users of the products and services.

From a systemic perspective, the actors of innovation ecosystems can acquire competitive advantage through the recognition of the holistic value that is embedded in products and services and the dynamic delivery systems to the customers (Ethiraj & Posen, 2013; Mäkinen & Dedehayir, 2013). For example, some platforms of Apple and Google are ecosystems based. Also, the platform of Uber and Airbnb can demonstrate situations where individuals can be simultaneously assumed to be a provider and as well products and services consumer but integrated by a system (platform) for exchange of those products and services. Hence, in the context of this research innovation ecosystem is considered as a smart environment that enables a collective functionality towards the creation and commercialization of innovative values, while instituting a functional barrier.

The Benefits of Innovation Ecosystem

The platform for innovation co-creation and collective functionality creates and maintains an active ground for the acting firms and associating individuals to enjoy various improvements and collective capabilities for business processes and performance. Dhanaraj & Parkhe (2006) consider the platform as a loosely coupled system that enable autonomous firms to orchestrate network activities that ensure value creation and extraction, without the hurdles of bureaucratically hierarchy. From the view of Barabba et al. (2002), such platforms provide the opportunity for the establishment of technical standards and building of dominant platforms for competitive advantage. Thus, an innovation ecosystem operates on the dynamic capability that enables the combination of structure, functionalities, components, and industrial changes to create value. On this, Weil et al. (2014) posit that the dynamic nature of innovation ecosystems provide opportunity for delivering dominant standards and designs, and the strengthening of variations in the marketplace. Other benefits include the acceleration of innovation circles and reducing the risks of market failure through consumer integration (Wong et al., 2016). Innovation ecosystem has the potentiality to increase the speed and effectiveness of enhancing organisational innovative culture without, as stated earlier, the hurdles of bureaucratic hierarchy (Dhanaraj & Parkhe, 2006).

The Challenges of Innovation Ecosystems

Literature highlights many challenges associated with building and managing innovation ecosystems. Rabelo & Bernus (2015) and Hwang et al. (2012) emphasise the challenges of an inadequate mind-set of the locals towards innovation, lack of readiness or preparedness of the actors for co-creation culture, lack of suitable framework for legal support or workable legal framework for coordinating collaborations, lack of trust for co-creation and collaboration, underestimating the difficulties and the required time for developing innovation and reaching to the required level of readiness. Other challenges include inadequate

cash flow within the innovation construct throughout the entire innovation development process, the notion of managing or perceiving ecosystems as a traditional enterprise without the understanding the intrinsic attributes of innovation. Further challenges are the environment with endogenous intellectual potentials, but with low diversify attributes, the attempt to replicate past successes without the understanding of the uniqueness of every success case and specific environment, insufficient infrastructural and institutions support, low life quality of certain cities, and lack of comprehensive mechanism for technology transfer. Literature has emphasised these challenges have caused the majority of innovation ecosystems to either fail in achieving the envisaged innovation impact or achieve lesser results than expected (Jackson, 2011; Olson et al., 2013).

The Concept of Corporate Agility

The most suitable definition of agility is coined by Ganguly et al. (2009), which considers agility as “an effective integration of responsive ability and knowledge management to rapidly, efficiently and accurately adapt to any unexpected (or unpredictable) change in both proactive and reactive business/customer needs and opportunities without compromising with the cost or the quality of the product /process” (Wendler, 2013, p. 1166). Other definitions such as Wimby & Worley (2014) considers it as a cultivated capability that allow organisations to facilitate timely, effective, and sustained changes at the demand of changing circumstances. Najrani (2016) views it as the ability and process of recognising change in the marketplace/environment and allocating the required resources that would allow taking advantage of the change to achieve the objectives of the organisation.

Wadhwa & Rao (2003), claim that agile firms are the ones that are capable of surviving through unpredictable changes in the marketplace/environment through a continuous sensing of market opportunities and acting appropriately. This in the view of Bernardes & Hanna (2009), agility means a swift and surprising reconfiguration of the available options to reap benefits from the unpredictable changes of the market environment. Thus, agility requires minimizing the uncertainties of the external environment and its effect through speedy and surprising solutions (Nemkova, 2017). On this vein, Cegarra-Navarro et al. (2016) argue that being agile entails detecting market opportunities in the midst of changing circumstances and exploit the advantage with speed and surprise. This is because a high level uncertain and changing environment can open windows of opportunities (Weerawardena et al., 2007) in every industry.

In the context of this research, agility is defined as the process of cutting the edge of rigidity by relying on informal rather than formal planning for a swift restructuring that allows commercially viable and creative/proactive responses to a changing environment. This is because the volatility of the current business environment does not require the use of long-term formal planning (e.g. a one-year or a five-year plan). Because, formal planning is characterized by high levels of rigidity that is not suitable for a swift response to uncertain environments (Nembova, 2017). Hence, to be agile and avoid inertia and rigidity, organisations are required to rely mostly on short-term informal planning that is more flexible and cost effective to re-adjust business operations that base flexible responses to uncertainties and would be creative, proactive and remain commercially viable.

The Examples of Corporate Agility

The agile culture has played drastic roles in the stories of the Silicon Valley and among firms such as Apple, 3M, W.L. Gore, etc. 3M, which generate disruptive technologies, new innovative products and have transformed many industries' competitive base to create huge wealth and the attempts to outperform these firms has been unsuccessful (Winby & Worley, 2014). Other firms such as Southwest Airlines, Tesco and private-equity groups like TPG Capital or Kohlberg Kravis & Roberts (KKR) have excelled at seizing the operational opportunities of agility through the shifting of resources including cash, talent, and switching managerial attention quickly and effectively from less promising business areas to more attractive areas, while Zara; the world's largest clothing retailer after overtaking Gap in 2008 has succeeded through ability to deliver new items to stores quickly (Sull, 2009).

Recently, the major market leaders in smartphones, tablets and apps are regularly re-engineering the whole base of consumer economy through the process of agility; from innovative access to information (Google) to real time communication (Facebook and Twitter), entertainment and media (YouTube), fast and cheaper transportation (Uber), unique hospitality system (Airbnb), dining (OpenTable and Yelp), etc (Moore, 2014). In other words, they are reconfiguring, and re-engineering consumers control on the

offering of product and services (Denning, 2015). These companies react and proactively respond to the necessary and required changes that put them on top in their industries. They have shortened and innovatively reconfigured the required development cycle of their products and services through the use of agile developments and management methods. Therefore, their achievements were based on a continuous deployment of practices and the provision of extremely fast and flexible reaction to ever-changing business needs (Arell et al., 2012).

Benefits of Agility

Several scholars suggest various ways agile concept can benefit organisations in addressing increased environmental uncertainties and competitive landscape. According to Afuah & Tucci (2003), the survival and competitiveness of firms rely heavily on the ability to be proactive in perceiving and developing the opportunities that create innovations. This is done through agility. This notion is supported by Doz & Kosonen (2010) which argue that agile concept enables firms to increase the level of response to disruptive threats, while Demil & Lecocq (2010) add that the concept also enhances resilience against the threats of the external forces. Expanding on this, Teece's (2010) opinion reflects that such response or resilience to external threats could be in the form of changing business models over time to stay competitive in the complex environment and achieve sustainable value creation.

Addressing the benefits further, Basile & Faraci (2015) argue that agility does not only help firms to facilitate and take advantage of business model changes to create opportunities for new value creation but also aid in the process of reducing the risk of inertia. The risk of inertia is always high especially when a firm has been successful in the long term with a certain strategy. Hence, the dynamic nature of agility enables firms to enhance their performances in the changing market conditions through the process of developing and reconfiguring the internal competences against external forces (Wu et al., 2015). Such competences according to Vecchiato (2015), facilitate a successful first mover advantage despite the levels of uncertainty increasing. This is because with agile practices, an organization can diligently predict the changes of the environment and proactively respond to them to outperform others in the same industry. Meanwhile, from a strategic view, Doz & Kosonen (2008) ascertain that agility in this context would enable a continuous adjustment and adapting of a firms strategic direction in any changing circumstance. Collectively, agility facilitates the reconfiguration of business models as a responsive mechanism against the threat and changes of the environment for the purpose of value creation or maximisation.

The Challenges of Agility

Despite the impact of agility in helping firms to address the continuous changing business environment, the management of agility is not without a series of challenges that could deter its actualisation in organisation. According to Lyke-Ho-Gland (2016), there are five major challenges of agility which are operational silos (lack of cross-functional communication), organizational resistance (resistance to change), slow decision-making, poor knowledge management, and unaligned business processes (lack of linking overall organisational objectives to the management processes or operational barriers).

Role of Agility in Innovation Ecosystem

Literature highlights that the roles of agile practices to produce high-speed innovations starts with the people of the organisation being engaged and ready to embrace new challenges (Ryan & Deci, 2000), open for generating new ideas (Fredrickson, 2001), facilitating learning (Bandura, 1977), and enabling vitality (Sonnetag & Niessen, 2008). This entails the process of encouraging the creation of market volatility and disruptions through the constant challenge of existing practices and pushing into uncomfortable territory. With these practices, the organisation seeks to identify and meet customer's unmet needs, identify the unexplored opportunities that would facilitate new diversified thinking, and accelerating the outcomes of the ideas to fruition.

However, uncertainties are always common with recent environment and where agile processes play significant role. In the situation of uncertainty, Wadhwa & Rao (2003) stress that agile firms should be capable to cope with changes that occur unpredictably in the marketplace whilst continuously sensing opportunities in the market and acting upon them. This is true since agility is considered as the ability for reconfiguring the available options in the market with surprise and speed for the purpose of reaping the benefits that emerge from the unpredictable changes in the marketplace (Bernardes & Hanna, 2009).

Thus, to achieve success in an uncertain situation, the literature presents several approaches of decision-making, such as planning and visionary approaches, adaptive and transformative approaches (Wiltbank et al., 2006; Reymen et al., 2016).

The tools of planning and visionary approaches, such as competitive analysis, scenario analysis/planning and real options, have high emphasis on predicting future outcomes, while the tools of adaptive and transformative approaches, such as causation and effectuation (Saravathy, 2001), and emergent strategy (Mintzberg, 1994), put less emphasis on prediction but higher emphasis on learning and experimentation. As a result, this research will focus on causation and effectuation decision-making approaches to establish the agile means of managing complexity in an uncertain environment.

The Causation and Effectuation Approaches of Decision Making

The causation approach involves analysing different means to achieve a specific goal and choosing the means that promises a better outcome (Wiltbank et al., 2006). In contrast to the causation approach of decision making, the effectuation decision-making approach, as proposed in various entrepreneurship literatures for dealing with uncertainties (Saravathy, 2001; Read et al., 2009; Wiltbank et al., 2006), relies on choosing between several effects that can be created using the means at hand (Saravathy, 2001; Wiltbank et al., 2006). With this approach, uncertainty could be dealt with by implementing more flexible approaches and investing non-critical resources into the perceived opportunities, whilst seeking early feedback in the process through the interactions with the stakeholder (Wiltbank et al., 2006; Saravathy, 2001).

Openness and Tolerance for Failure

Despite the decision-making approach a firm may consider to best support agility, it is vital to be aware that the process of innovation always involves risk, while the implementation never guarantees success. Therefore, it is suggested that organisations must learn to learn and learn to unlearn (Asian Development Bank, 2009). However, to effectively learn and unlearn for fostering innovation, Alexander et al. (2015) suggest that organisations must create the culture of tolerance for failure. This is because according to Tahirsylai (2012) there is no innovation where success is only promoted, and no risk is encouraged. While decision made on basis of past success may not necessarily be the best decisions (Dietrich, 2010). Instead, it is vital to always examine different choices with less regard to the past success. Stressing more on this, Cyert & March (1963) argue that organizations can engineer unlearning through failure. This is because organisations are more likely to adjust behaviours and pattern of operations while responding to failure, than they are likely to do when responding to success. In the view of Serrat (2015), tolerance for failure is a rule in the modern society rather than an expectation. Thus, the allowance of failure in the innovation development process is a mind shift that is highly required in a turbulent or uncertain environment. This is because failure facilitates the act of investigation that could lead to subsequent success. Hence, failure breeds success.

The Creation and Adopting of Disruptive Technologies through Agility

Kane et al. (2015) argue that firms can capitalise on the changing environment to create a niche and expand it towards the disruption of existing product in the market. Therefore, there are the possibilities for capitalizing on the opportunities presented by the changing environment to create disruptive technologies. The term disruption technology emerged from Christensen theory of disruptive innovation (Christensen, 1997), which is a process where a new technology from a smaller firm causes the failure of great firms. So many authors have tried to explain the theory of disruptive innovation, but the overriding view is that it represents a case when incumbent firms focus on the improvement of their products and services for the most profitable customers, and tend to ignore a certain segment, which the entrants target and gain a foothold by delivering more-suitable functionality at a lower price (Christensen et al., 2015). The incumbents would tend not to respond vigorously, thus enable the entrants to move upmarket and deliver the performance that the incumbents' mainstream customers require, while preserving the advantages that drove their early success, thus causing disruption (Christensen et al., 2016).

Paetz (2014) argues that although the attributes of disruptive innovation indicate providing cheaper or lower quality products or services at the low end than the available alternatives, but focusing on cheaper or lower quality product or services, could lead to the production of something consumers will not want.

Thus, creating disruptive technologies starts with spotting opportunities for such disruptions. To spot the opportunities for disruptive technologies, Paetz (2014) posit that attention should be given to three elements which are scarcity (shortage of anything desired or needed by the people), default corporate management behaviour (comfortable serving a large market segment and ignores the low-end profitable part of the market) and human nature (complacent due to past success). On another perspective, Danneels (2008) argues that creating disruptive innovations can be facilitated by the willingness of an organisation to cannibalise on its valuable assets for the productive purpose that would contribute new technological capabilities. According to Yeow et al. (2017), this could be achieved by reconfiguring the existing resources to create new resources and processes. The combination of the configured resources and processes would develop a new competence (Danneels, 2010), such as new technological competence through which certain new products or market competence would be created for new customer group.

Meanwhile, every radical technological change (disruptive technologies) often creates gaps for firms to develop next disruptive change. This is because the radical change presents new technological knowledge and alternatives that can usher new ways of delivering organizational activities as well as new ways of creating value (Karimi & Walter, 2015). In other words, through dynamic capabilities, firms can sense, seize, reconfigure, and transform this capability gap into a new disruptive market. That means, the distance between the firms existing configuration of capabilities and the recent technological change (Lavie, 2006), is a gap that will enable the firm to develop or acquire new sets of capabilities required for creating a new technological subfield or incorporate/adopting new technology for the creation of values in the market (Karimi & Walter, 2015).

To actualise this vision, Martini et al. (2016) posit the reconfiguration of operating models, cultures, and technology architectures to build the flexible foundation that could meet the requirements for responding to rapidly changing customer and business requirements. This is where agility plays a strong role. With such process in place innovation ecosystems can create and build the platforms that would be too big to challenge or compete with such Uber's taxi platform, Airbnb, Amazon's ecommerce suite, etc. However, it is important for the actors to understand the appropriate time for launching new platforms or the repositioning of the existing ones for better performance.

Research Methodology

This research used semi-structured interviews to obtain the views of the research participants, and observations to support the information provided by the interviewees. Purposive sampling was used for the interviews. The purposive sampling technique enabled the researcher to select information-rich participants in the technology industry, especially the managers and decision makers who possess sufficient knowledge and experience in the areas of agility, innovation ecosystem and disruptive technologies. This type of sampling was considered due to its vital attributes in the context of the research because that enabled the researcher to select people and organisations that have direct reference to the research phenomenon (Bryman, 2008).

Potential participants were contacted through professional network of RSA (The Royal Society, UK), in which the researcher is a fellow (member) and can contact other fellows for research and other professional related activities. About 50 potential participants were contacted with focus on CEOs, founders & co-founders, managers in the technology industry and other specialists with good knowledge of agile concept, innovation ecosystems and strategy. However, out of the 50 sent invitations, 15 agreed to participate in the research through face-to-face interview, phone interview and skype interview. The duration of the interviews was between 20 and 30 minutes.

On the other hand, critical case sampling; a part of purposive sampling technique was used in the observations. The critical case sampling allowed the researcher to select a small number of important case that would produce useful information and great impact on the development of knowledge (Patton, 2002). Therefore, the researcher observed some cases that indicate how some innovation ecosystems were agile in the process of technological innovation development and validated the interview responses.

Thematic analysis was used to analyse the collected data. The themes were developed based on the findings of the literature review and issues raised by the participants in the interviews. For example, some of the participants emphasized the importance of facilitating change in organisation for creating a bigger value rather than for changing purpose. After the interviews, the data was cleaned, organized and displayed in such a way that will underpin the overall aim of the research.

Concluding Summary

This review aims at adopting the concept of agility in innovation ecosystem for the creation and adopting of disruptive technologies by SMEs in Africa. Through the exploration of the various literature, it is found that despite the benefits of innovation ecosystem for fostering innovation and addressing social-economic problems, several challenges are causing most of the platform to either fail in achieving the envisaged innovation impact or achieve lesser results than expected. To overcome the challenges, the literature proposes the elements of agile practices which consist of reconfiguring internal resources, structures, and processes to adapt swiftly to the changing environment/market condition or spot the gap that can create opportunities for new market disruptions in the context of technology. However, these elements of agile practices would be effectuated by a set of organizational actions that would eliminate inertia, unlock new innovations opportunities and serve as the keys factors for adopting or creating disruptive technologies.

The next phase of this research will address findings, which will be discussed in conjunction with this literature review and in the context of African SMEs. The research findings and discussions will aid in the proposal of dynamic capabilities and impactful knowledge that would facilitate co-creating culture among African SMEs for the creation of produced capital (tools, technologies, intellectual property, etc.) in the continent using innovation ecosystem model rather than relying heavily on the degenerating natural capital.

REFERENCES

- Adner, R., & Kapoor, R., 2010. Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31, 306-333.
- Afuah, A., & Tucci, C., 2003. *Internet business models and strategies: Text and Cases*. McGraw-Hill, 2nd edition, Boston.
- Alexander, A., Berthod, O., Kunert, S., Salge, T. O. & Washington, A. L., 2015. *Failure-Driven Innovation*. Berlin: artop GmbH.
- Arell, R., Coldewey, J., Gat, I. & Hesselber, J., 2012. *Characteristics of Agile Organizations*. Agile Alliance.
- Asian Development Bank, 2009. *Dimensions of the Learning Organization*. Manila: Asian Development Bank.
- Autio, E., & Thomas, L. D. W., 2014. Innovation ecosystems: Implications for innovation management? In: Dodgson, M., Gann, D. M., Phillips, N. (eds.) *The Oxford Handbook of Innovation Management*. Oxford Handbooks Online.
- Bandura, A., 1977. *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barabba, V., Huber, C., Cooke, F. & Pudar, N., 2002. A multimethod approach for creating new business models: the general motors. *Interfaces*, 32 (1), 20.
- Basile, A. & Faraci, A., 2015. Aligning management model and business model in the management innovation perspective: The role of managerial dynamic capabilities in the organisational change. *Journal of Organizational Change Management*, 28 (1), 43-58.
- Bernardes, E. S., & Hanna, M. D., 2009. A theoretical review of flexibility, agility, and responsiveness in the operations management literature: Toward a conceptual definition of customer responsiveness. *International Journal of Operations & Production Management*, 29 (1), 30-53.
- Bryman, A., 2008. *Social Research Methods, 3rd edition*. New York: Oxford University Press.
- Carayannis, G., Barth, D., & Campbell D. 2012. The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. *Journal of Innovation and Entrepreneurship*, 1 (2), 1-12.
- Cegarra-Navarro, J., Soto-Acosta, P., & Wensley, A. K. P., 2016. Structured knowledge processes and firm performance: The role of organizational agility. *Journal of Business Research*, 69(2016), 1544 – 1549
- Christensen, M. C., 1997. *The Innovators Dilemma: When New Technologies Cause Great Firms to Fail*, USA, Harvard Business Review Press.
- Christensen, C. M., Raynor, M. E. & McDonald, R., 2015. What Is Disruptive Innovation? *Harvard Business Review*, December 2015, 44 – 53.
- Christensen, C. M., Altman, E. J., McDonald, R. & Palmer, J. 2016. Disruptive Innovation: Intellectual History and Future Paths. *Harvard Business Review*, Working Paper 17 – 057.
- Cyert, R. M., & March, J. G., 1963. *A Behavioural Theory of the Firm*. New York: Prentice-Hall, Englewood Cliffs.
- Danneels, E., 2008. Organizational antecedents of second-order competences. *Strategic Management Journal*, 29, 519-543.
- Dedehayir, O., Mäkinen, S. J., & Ortt, J. R., 2016. Roles during innovation ecosystem genesis: A literature review. *Technological Forecasting & Social Change*, 2016.
- Demil, B. & Lecocq, X., 2010. Business model evolution: In search of dynamic consistency. *Long Range Planning*, 43 (2) 227–246.

- Denning, S., 2015. Agile: it's time to put it to use to manage business complexity. *Strategy & Leadership*, 43 (5), 10 – 17.
- Dhanaraj, C., & Parkhe, A., 2006. Orchestrating innovation networks. *Academic Management Review*, 31 (3), 659 - 669.
- Dove, R., 2005. *Fundamental principles for agile systems engineering*. In Conference on Systems Engineering Research (CSER), Stevens Institute of Technology, Hoboken, New York.
- Doz, Y. L., & Kosonen, M., 2010. Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning*, 43, 370–382.
- Ethiraj, S. K., & Posen, H. E., 2013. Do product architectures affect innovation productivity in complex product systems? In: Oxley, J.E., Silverman, B., Adner, R. (eds.) *Collaboration and Competition in Business Ecosystems. Advances in Strategic Management*, 30, 127–166.
- Felipe, C. M., Roldán, J. L., & Leal-Rodríguez, A. L., 2016. An explanatory and predictive model for organizational agility, *Journal of Business Research*, 69, 4624 – 4631.
- Fredrickson, B., 2001. The role of positive emotions in positive psychology: The broaden and-build theory of positive emotions. *American Psychologist*, 56 (3), 218 - 226.
- Ganguly, A., Nilchiani, R. & Farr, J. V., 2009. Evaluating Agility Incorporate Enterprises. *International Journal of Production Economics*, 118, 410–423.
- Gawer, A., 2014. Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43, 1239–1249.
- Gomes, L. A. V., Facin, A. L. F., Salerno, M. S. & Ikenami, R. K., 2016. Unpacking the innovation ecosystem construct: Evolution, gaps and trends. *Technological Forecasting & Social Change*, 2016.
- Hwang, V. W., & Horowitz, G., 2012. *The Rainforest – The Secret to Building the Next Silicon Valley*. Regenwald Publishers, USA.
- Jackson, D., 2011. What is an Innovation Ecosystem? *National Science Foundation*, 1 - 12.
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N., 2015. Strategy, not Technology, Drives Digital Transformation - Becoming a digitally mature enterprise. *MIT Sloan Management Review*, September.
- Karimi, J., & Waltera, Z., 2015. The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry. *Journal of Management Information Systems*, 32 (1), 39–81.
- Lavie, D., 2006. Capability reconfiguration: An analysis of incumbent responses to technological change. *Academy of Management Review*, 31, 153–174.
- Lee, S. M., & Trimi, S., 2016. Innovation for creating a smart future. *Journal of Innovation & Knowledge* (2016).
- Lyke-Ho-Gland, H., 2016. *Overcoming the 5 Obstacles to Organizational Agility*. APQC, November.
- Mäkinen, S. J., & Dedehayr, O., 2013. Business ecosystems' evolution – an ecosystem clock speed perspective. In *Collaboration and Competition in Business Ecosystems. Advanced Strategic Management*, 30, 99–125.
- Martini, L., Ciobo, M., & Rose, L., 2016. *Eight steps to foster innovation through successful ecosystems*. Accenture Strategy.
- Mintzberg, H., 1994. *The Rise and Fall of Strategic Planning*. Harlow: Pearson Education Limited.
- Najrani, M., 2016. The endless opportunity of organizational agility. *Strategic Direction*, 32 (3), 37 – 38.
- Nemkova, E., 2017. The impact of agility on the market performance of born-global firms: An exploratory study of the 'Tech City' innovation cluster. *Journal of Business Research* (2017).
- OECD, 2010. *Innovation to strengthen growth and address global and social challenges*. Available at <http://www.oecd.org/sti/45326349.pdf>
- Olson, S., & Dahlberg, M., 2013. *Trends in the Ecosystem: Can Past Successes Help Inform Future Strategies?* The National Academies Press. Washington D.C.
- Paetz, P., 2014. *Disruption by Design: How to Create Products that Disrupt and then Dominate Markets*. New York: Apress
- Patton, M., 2002. *Qualitative Research and Evaluation Methods* (3rd edition). Thousand Oaks, CA: Sage.
- Rabelo, R. I., & Bernus, P., 2015. A Holistic Model of Building Innovation Ecosystems. *IFAC-Papers Online*, 48 (3), 2250 – 2257.
- Read, S., Song, M., & Smit, W., 2009. A meta-analytic review of effectuation and venture performance. *Journal of Business Venturing*, 24, 573–587.
- Reymen, I., Berends, H., Oudehand, R. & Stultiens, R., 2016. Decision making for business model development: a process study of effectuation and causation in new technology-based ventures. *R&D Management*, 47 (4), 2016
- Ryan, R., & Deci, E., 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55 (1), 3-66.
- Sarasvathy, S. D., 2001. Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 15, 243–263.
- Serrat, O., 2015. *Embracing Failure*. Manila: Asian Development Bank.
- Sonnentag, S., & Niessen, C., 2008. Staying vigorous until work is over: The role of trait vigour, day-specific work experiences and recovery. *Journal of Occupational & Organizational Psychology*, 81 (3), 435-458.

- Sull, D., 2009. Why Good Companies Go Bad. *Harvard Business Review*, July–August.
- Teece, D. J., 2010. Business models, business strategy and innovation. *Long Range Planning*, 43, 172–194.
- Thomas, L.D.W., & Autio, E., 2013. Emergent equifinality: An empirical analysis of ecosystem creation. *Proceedings of the 35th DRUID Celebration Conference 2013 Barcelona*, Spain. June 17–19
- Tahirsylaj, A. S., 2012. Stimulating creativity and innovation through Intelligent Fast Failure. *Thinking Skills and Creativity*, 7 (1), 265-270.
- Vecchiato, R., 2015. Strategic Planning and Organizational Flexibility in Turbulent Environments. *Foresight*, 17 (3), 257-273
- Wadhwa, S., & Rao, K. S., 2003. Enterprise modelling of supply chains involving multiple entity flows: Role of flexibility in enhancing lead time performance. *Studies in Informatics and Control*, 12 (1), 5 - 20.
- Weil, H. B., Sabhlok, V. P. & Cooney, C. L., 2014. The dynamics of innovation ecosystems: A case study of the US biofuel market. *Energy Strategy Reviews* 3 (2014), 88 – 99.
- Wendler, R., 2013. The Structure of Agility from Different Perspectives. *Proceedings of the 2013 Federated Conference on Computer Science and Information Systems*, 1165–1172.
- Weerawardena, J., Mort, G. S., Liesch, P. W., & Knight, G., 2007. Conceptualizing accelerated internationalization in the born global firm: A dynamic capabilities perspective. *Journal of World Business*, 42 (3), 294 - 306.
- Wiltbank, R., Dew, N., Read, S., & Sarasvathy, S. D., 2006. What to do next? The case for non-predictive strategy. *Strategic Management Journal*, 27, 981–998.
- Winby, S., & Worley, C. G., 2014. Management processes for agility, speed, and innovation. *Organizational Dynamics*, 43, 225 – 234.
- Wong, T. Y. T., Peko, G. Sundaram, D., & Piramuthu, S., 2016. Mobile environments and innovation co-creation processes & ecosystems. *Information & Management*, 53, 336–344.
- Wu, K. J., Liao, C. J., Tseng, M. L., & Chou, P. J., 2015. Understanding innovation for sustainable business management capabilities and competencies under uncertainty. *Sustainability*, 7 (10), 13726–13760.
- Yeow, A., Soh, C., & Hansen, R., 2017. Aligning with new digital strategy: A dynamic capabilities approach. *Journal of Strategic Information Systems*, September.