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Digital Skills and Strategic Postures: Insights from African Digital Entrepreneurs

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11.1 Introduction

The 'ubiquitous' nature of the internet has stimulated a renewed interest in digital entrepreneurship in Africa (Ranchhod, 2019). Unlike conventional entrepreneurship, the processes of digital entrepreneurship require a high degree of ICT competencies to integrate web applications, customise market-specific online experiences, build technology infrastructure, integrate business processes, and build brand community (Ngoasong, 2018). Specifically, digital entrepreneurship encompasses the processes of production, application, and distribution of technology (digital software) by '*skilled* and *opportunity-oriented* individuals and ventures' (Bolat, 2019; Friederici, 2019: 10). The process also entails 'identifying technology-intensive opportunities, efficient gathering of

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resources, such as capital and talents, adapting to rapid growth and changes' (Siyanbola et al., 2011).

Higher digital competencies can increase the likelihood of interpreting contextual constraints as entrepreneurial opportunities (Ngoasong, 2018), as well as a more positive outlook for interpreting situated contextual challenges as an asset instead of a liability (Welter, 2011). Digital skills also enable digital entrepreneurs to shape and influence their entrepreneurial choices and post-entry strategic decisions (Autio et al., 2014). This has led to some new generation of African entrepreneurs becoming active seekers of digital skills—hence the rise of digital skills provisioning as a key aspect of Africa's digital entrepreneurial ecosystem (Sussan & Acs, 2017).

Many digital entrepreneurs in Africa embark on the journey of digital skills development without a clear strategy due to insufficient entrepreneurial digital competencies (EDC) (Ngoasong, 2018). Failure to pursue a strategic approach for digital enterprises often leads to an eclectic collection of a broad 'hodgepodge' (Shane & Vankataraman, 2000), of a mainly fragmented portfolio of digital skills, not enabling them to create and capture value locally and globally (Lepak et al., 2007). The above is not surprising since the field of entrepreneurship itself has been described as a 'broad label under which a hodgepodge of research is housed' (Shane & Vankataraman, 2000). Although the 'ubiquitous' nature of the internet has enabled numerous opportunities in the African continent, it has also escalated the need to acquire multiple digital skills (Taura & Radicic, 2019).

The above developments have led to the creation of multiple skills provision platforms in Africa, namely digital/tech hubs, innovation labs, hackerspaces, fab/maker spaces, DIY labs, among others (Atiasea et al., 2020; Friederici, 2019; Hopkins, 2015). Unfortunately, the development of such platforms has not led to commensurate creations of world-class digital ventures/solutions to come out of Africa. The average African digital enterprise has been described as entities unable to expand internationally, attract VC, disrupt traditional industries, and create local digital infrastructures (Friederici et al., 2020). Scholars argue that the internet connectivity may have even worsened instead of enabling opportunities

for African regions to catch up with the rest of the world (Friederici et al., 2017; Ojanpera et al., 2017).

Contrary to above, as indicated across the continent, especially in the digital incubators (Ngoasong, 2018)—a new generation of digital entrepreneurs is on the rise (Ngoasong, 2018). The nature of their networks is characterised by: (the use of modern IT, trust, transparency, advocacy, commitment to intra-African commerce, and vision to promote regional economic integration) (McDade & Spring, 2005). They are transforming the African business landscape, particularly through a strengthened private sector economic growth (McDade & Spring, 2005). We believe that the heterogeneity of the African business landscape makes the tendency to assume their universal underperformance or non-performance to be untenable. We take a pragmatic view of the African digital landscape focusing on the variations in the performances of African digital enterprises—in which due to differences of strategic postures and practices induced by skills-sets, some African digital entrepreneurs remain stagnant, some retrogressed, but some few prosper locally or globally (Taura & Radicic, 2019; Taura & Watkins, 2014). Our quest to understand the nature of these variations in digital skills-sets and competencies in Africa, and how they create and capture value (Lepak et al., 2007) has spurred our focus on a central research question that seeks to find:

> What strategic postures and practices are deployed by successful African digital enterprises, and how do they develop their portfolio of digital skills-sets and entrepreneurial competencies?

The above central research question has led to the development of four baseline propositions taking into consideration peculiarities and hostile environment of doing digital business in Africa (Chakravorti & Chaturvedi, 2019), and the penurious resources environment (inhibited mainly lack of digital infrastructure) among others. The propositions encompass aspects of digital bricolage, passion and learning from failure, breadth and depth of digital skills, as well as co-evolution of digital competencies. This study is vital, as we believe that by understanding the strategic postures and practices of digital enterprises in Africa, we

can propose theoretical advances that are quintessentially African. In so doing, the identified salient features that enable these African digital firms to succeed despite the challenges and limitations in their environments can provide a source of local narrative and aspirational capital for prospective African digital enterprises to seek to achieve (Friederici et al., 2020). Our work is influenced by theories of entrepreneurial, strategic, and organisational actions (Greenfield & Ribbins, 1993; McMullen & Shepherd, 2006).

The chapter is organised as follows: the introduction sets the stage and raises the central research question. Thereafter, the emergence, concept, and scope of African digital entrepreneurship are traced and examined to provide an overview. Before examining the strategic postures and practices, the debates in regard to the digital skills paradox are presented, taking into consideration the African experiences. Finally, and in the light of proposed theoretical advances and the African-centric narrative of digital enterprises, four baseline propositions are postulated.

Also, we summarised the propositions in the form of a practical tool/matrix, which other African digital entrepreneurs could employ while developing their digital skills and competencies portfolio. The chapter concludes with insights and potentials of skills development and digital entrepreneurship in Africa.

11.2 Digital Entrepreneurship in Africa: Emergence, Concept, and Scope

11.2.1 Emergence of Africa Digital Entrepreneurship

Although Sub Saharan Africa (SSA) is 'one of the least wired parts of the globe' (Poushter et al., 2018: 6), the arrival of undersea digital networks such as Seacom, EASSy, TEAMS, WACS, and ACE (Africa Coast Europe), among others has led to the emergence and development of a critical mass of digital enterprises in Africa (Ranchhod, 2019). Despite a late start, Africa experiences one of the fastest growth rates of internet usage globally (Gathege & Moraa, 2013). Consequently, between 2010 and 2016 alone, it was estimated that about 173–314

digital/tech hubs sprung up on the African soil to support entrepreneurs (Friederici, 2019).

The digital networks as well as support organisations such as tech hubs have enabled and supported the proliferation of newer forms of opportunities for entrepreneurs to exploit a digital space in both coastal and landlocked areas of Africa (Friederici et al., 2017; Ranchhod, 2019). Also, the new media (social media) have stimulated, and deepened interests in internet-enabled services/ventures and are shaping new practices and experiences for African digital entrepreneurs (Bolat, 2019). The ubiquitous nature of the internet has risen the aspirations of African entrepreneurs to create and capture values on a level playing space beyond traditional borders, in ways that were not thought possible (Taura et al., 2019; Friederici et al., 2020; Sussan & Acs, 2017). The aspiration of digital entrepreneurship to become a powerful driver to local economic transformation and development in Africa as well as the mobile-first mindset are leading to significant changes in the landscape (Bolat, 2019; Ndemo & Weiss, 2016; IMDs World Digital Competitiveness Index, 2017).

Today Africa is home to many digital-based ventures, including software development, digital platforms, e-commerce, and multi-media—who sell digitised products and services (Ngoasong, 2018). Particularly, the two largest economies, Nigeria and South Africa remain in the 'break out' and watch out zones, respectively, and digitally savvy Kenya has picked up an impressive level of momentum by assembling a thriving ecosystem (Chackrovarti et al., 2017). The above demonstrates how digital entrepreneurship is emerging, with variations among the African countries on digitalisation likely to generate more healthy competitions, growths, and competitiveness on the continent (Taura et al., 2019).

11.2.2 Concepts of Digital Entrepreneurship in Africa

The digital entrepreneurship concept and processes essentially involve the production and trading of '*digital artefact*'. These are 'man-made

purposeful objects embodied in information and communication technology components of software and hardware' (Von Briel et al., 2018: 292). They can be re-combined, edited, and distributed, as well as offer unlimited scope to developing new digital solutions (Wim and Werner, 2019), thus, require complementary digital skill-sets. Digital skills deficiencies (technical and content-related), (Claro et al., 2012; Janssen et al., 2013) have become one of the most significant factors inhibiting Africa to realise the full potential offered by the digital revolution. As entrepreneurs can develop successful entrepreneurial ventures by delegating the technical operations in more capable hands, we follow other scholars shift towards what is considered as the higher order or content-related skills (Claro et al., 2012; Janssen et al., 2013).

We consider the entrepreneurial search process as essentially cognitive (Simon, 1969; Sarasvathy, 2001; Sarasvathy, 2003)—hence a digital entrepreneur in the twenty-first century should be fully equipped with the cognitive competencies dimension of the digital entrepreneurial process, including critical thinking, creativity, and problem-solving (Wechsler et al., 2018). Cognitive research in entrepreneurship has consistently demonstrated how cognitive mastery can lead to 'expert entrepreneurship' (Sarasvathy et al., 2008; Sarasvathy, 2001). We believe the twenty-first-century African digital entrepreneur who masters the cognitive processes to 'search for relevant information, justify their choices, generate innovative and worthwhile ideas for their fields, and find solutions to the problem in digital environments' would be the most effective to create and capture value (Şendağ & Odabaşı, 2009; Yang, 2015).

11.2.3 Scope of Digital Entrepreneurship and Skills in Africa

Regarding the scope of digital entrepreneurship and skills in Africa, the following are crucial: the higher order cognitive digital skills: '*information digital skills*' (defining the search queries, selecting a website to seek information, selecting information or in search results, and evaluating the information found); '*critical thinking digital skills*' (justification, breadth

of understanding, and critical assessment); '*creative digital skills*' (fluency and originality); '*problem-solving digital skills*' (identifying the problem, providing appropriate solutions, and explaining the solutions) (Van Laar et al., 2018). Of the four higher order cognitive digital skills identified, research has shown that the most difficult ones are 'information digital skills' as well as 'problem solving digital skills' (Van Laar et al., 2018).

UNESCO Digital Skills for Life (2017) has also identified the following key digital skills: *Networked computing* (skills such as transmedia navigation, circulation of contents, and understanding of audiences); *Social and Collaborative* (collaborative problem-solving, social skills to participate in online communities); *Proprietary and open forms of technological provision* (co-production requires technical skills, collaborative design capabilities, and understanding of IP). *Participatory/Co-creation and Making* (working creatively together with others, multitasking, experimentation); *Data-based and Computational* (data literacy skills, understanding of algorithms); *Remote and Automated Systems* (interpersonal; skills to collaborate alongside machines and other automated systems. We believe the starting point for the continent of Africa is to consider developing an effective system of strategic skills development, including (re-skilling and or up-skilling) to encourage digital entrepreneurs, and intrapreneurs on the continent to develop digital competencies. In response to the needs of African digital entrepreneurs, we have proposed certain useful strategic postures that can enable them to pursue the development of digital competencies over time.

11.3 Digital Skills Deficiency: A Quintessentially African Experience

Several studies have already established that African entrepreneurs suffer from poorly developed entrepreneurial skills, lack of skilled personnel, low-level technological capabilities, and limited technical and technological human resources (Adeboye, 1997; Fick, 2002). Some even argued that such negative skills development path was inherited since independence (Adeboye, 1997; Fick, 2002; Robson et al., 2009).

A new generation of platforms, mainly in form of DIY-Tech Hubs, Fab Maker spaces, are challenging the traditional University systems in Africa—with newer approaches to knowledge and skills development for entrepreneurs (Mounde et al., 2020). These are platforms that provide enabling environment for engaging users and stakeholders in knowledge co-creation in African settings (Mounde et al., 2020). Within the last three years, the number of tech hubs in Africa doubled from 314 in 2016 to 643 in 2019 (Kelly et al., 2016). They can operate as incubators, accelerators, co-working spaces, fab/maker spaces, etc. They often use their virtual learning platforms to foster skills development through training and workshop—thus broadening and deepening the skills need of African entrepreneurs (David-West et al., 2018; International Trade Centre, 2019). They focus on Mode–2 knowledge creation (which is knowledge created in the context of application) (Mounde et al., 2020). Consequently, they provide an alternative avenue for tacking local and community solutions using below-the-radar innovations (Mounde et al., 2020).

A variation of the DIY-Tech hub, referred to as fab/maker space movement, focuses on people who engage in the creative production of artifacts in an open space—using example rapid prototyping, innovative thinking (Mounde et al., 2020). There are now over eight maker spaces in Kenya (Nairobi, Kisumu, and Mombasa) as well as one in the University of Nairobi (Baarbé & Nzomo, 2017). Often associated with tinkerers, hackers, designers, and inventors—but now found legitimacy in universities as fab labs (Vossoughi et al., 2016). They operate based on the philosophy of democratisation of knowledge and access to tools/skills normally preserved for experts (Sheridan et al., 2014).

In the light of the development of skills provision centres across Africa in the form of digital/tech hubs, Fabs and Makerspaces labs, incubators/accelerators, digital training platforms, as well as traditional University skill centre provisions among others, it is expected that there would be a fundamental rise in entrepreneurial and digital competences across the continent. Paradoxically, the dramatic explosion of skills provision centres has not translated into a commensurate entrepreneurial and digital competence across the continent. It has been quite challenging for the hubs to find and utilise experienced entrepreneurs to pass on

their skills to less experienced ones, due to lack of real engagement and commitment (Friederici, 2019). A report published by Harvard Business Review on the ranking of the countries by tech, data, and business skills generates some thought-provoking results on the position of developing economies in particular Africa.

> Countries with developing economies — and with less to invest in education — see the largest skill deficiencies, with 90% ranking in the lagging or emerging categories. A country's rank across the business, technology, and data science is negatively correlated with per-capita GDP and positively correlated with automation risk, meaning more skilled countries show better economic performance and lower risk of labor market disruption from automation. (Sands & Bakthavachalam, 2019)

Of the 60 countries included in the report, Nigeria was classified as a laggard country Number 53 (business skills) and last number 60 (tech skills) (Sands & Bakthavachalam, 2019). Also, Egypt and Kenya were ranked as 57 and 58, respectively, on tech skills (Sands & Bakthavachalam, 2019). In addition to the above, the only African country that made it to the Ease of Doing Digital Business, South Africa, was not a strong performer either (Chakravorti and Chaturvedi, 2019). The Africa story of skills deficiency is not, however, a final arbiter (conclusive)—regarding Africa's skills development potentials.

Some reports focusing on the evolutionary tendencies have mapped Africa's digital skills landscape with a more positive outlook for the future. For example, Chakravorty et al. (2017), which focused on mapping the digital momentum zones in Africa, reported that 'the two largest economies, Nigeria and South Africa, remain in Break Out and Watch Out zones, respectively, digitally savvy Kenya has picked up an impressive level of momentum by assembling a thriving ecosystem'.

The African youths aspiring to become digital entrepreneurs have chosen to focus their primary question on how can they organise their entrepreneurial and digital skills search and retention more effectively, rather than worrying about the systemic challenges of corruption, market failures, political instability, and weak institutions (Adeboye, 1997; Fick,

2002; Robson et al., 2009). They realised that unlike their counterparts in more advanced economies, they must learn to handle the double burden of having to learn institutional entrepreneurship in the process of becoming effective digital entrepreneurs. They traverse the difficult and sometimes hostile terrain of doing digital business rather patiently—while building their skills. Accordingly, they are more likely to concern themselves with evaluating and assessing which of the skills provision sources are more appropriate for their skills development and prospects. Below we explore ways in which some African entrepreneurs are prospering by following certain strategic postures:

11.4 Propositions on Strategic Postures

11.4.1 Digital Bricolage as a Strategic Posture-1

African digital entrepreneurs operate in environments with penurious resources constraint, which necessitate them to become digital bricoleurs early in their start-up journey (Levi-Straus, 1996; Ruling & Duymedjian, 2014). They develop enterprises within a digital ecosystem with weak infrastructural capabilities (Susan & Acs, 2017). Their limited resources and identity forced them into a closed and finite world of inward resource seeking—hence provoking them to use 'what is at hand' and familiar (Levi-Straus, 1996). One African entrepreneur stated how 'making do' with available 'digital asset' a computer triggered him into becoming a digital media entrepreneur as stated below:

> After graduation, there were no jobs. My dad bought me this machine [pointing to a desktop computer] which is eight years old now. I sat with my computer and started learning and developing my business. I refer to it as a media business. We help institutions to communicate online, on print, brochures, letterheads and business cards. We use ICT as a vehicle to do our business. (Entrepreneur 4, cited in Ngoasong, 2018: 493)

Digitalisation and dematerialisation facilitated their ability to enact digital bricolage by 'making do' applying combinations of the digital

resources at hand to new problems and opportunities (Levi-Straus, 1996; Ruling & Duymedjian, 2014). They tended to highly rely on their coordinating mechanisms to mix and recycle digital opportunities into new meaning to solve local problems (Levi-Straus, 1996; Ruling & Duymedjian, 2014). The study reported how an African entrepreneur developed an app that uploaded the packages of local tourist attractions in Cameroon, acting as an online medium coordinating between the local tourist agencies and tourists (Ngoasong, 2018).

Hence, the entrepreneur applied digital bricolage by identifying under-utilised resources (unavailable local tourist information online), mixing it with data collection by physically travelling to the tourist destinations—and thereafter, made it available for tourists at a commission (Ngoasong, 2018). Since digital resources and ubiquitous connectivity have opened up almost limitless possibilities to share, assemble, and re-combine resources online (Ruling & Duymedjian, 2014; Taura & Radicic, 2019), they often began their search for under-utilised/underrepresented digital assets to be combined, or re-mixed early in their start-up journey. Also, since they realised they do not have resource advantages available to the larger digital platforms (unicorns) operating in more favourable environments to develop legitimacy, they focus attention on the local resources available to them, including their technical knowledge owner's technical knowledge base (Cooper, 1971; Watkins, 1973), amateur local (developers, programmers, coders, etc.) and self-taught skills that would otherwise go unapplied (Vallierie & Gegenhuber, 2014), to create functional platforms with less aesthetic properties. In addition, another African entrepreneur was reported to have explained how limited access to finance has led them 'to rely on students, interns with knowledge of IT and market research, hired ad-hoc on either low pay or as volunteers to physically collect and input the travel data of local bus companies on to the digital platform' (Ngoasong, 2018).

Their main challenge often arises in designing and developing digital artefacts—by drawing from fragments of the best possible eclectic sources and sampling of available digital skills and other resources locally (Vallierie & Gegenhuber, 2014). In particular, the knowledge required

for sources of digital skills supply as well as the coordinating mechanism to create, share, and exchange digital artifacts are limited in Africa (Ruling & Duymedjian, 2014). For example, a study suggests that, despite the hopes of democratisation afforded by the information revolution, the SSA is still struggling to provide an atmosphere for efficient collaborative software development/coding, and internet domain registrations (digitally mediated knowledge production) in comparison to other geographical spaces around the world (Ojanpera et al., 2017).

The above can be exacerbated by the tendency of collective bricolage (world view)—which arises due to shared socio-cognitive proximities (Bechky & Okhuysen, 2011). Consequently, this puts the digital bricoleurs under pressure to coordinate knowledge/content production and exchange on an online community-based system in digitally mediated spaces (Ojanpera et al., 2017; Ruling & Duymedjian, 2014). They have had to remain creative under pressure and apply themselves to knowing all the available digital resources/skills in their locality '*intimately*', establish coordinating mechanisms to enable digital bricolage, leading to insights from novel combinations (Ruling & Duymedjian, 2014). A new generation of African entrepreneur-bricoleurs (Ngoasong, 2018), highly educated, and professionally networked are changing the narrative of how digital bricolage is enabling them to forge new ways of digital value creation.

Some of these entrepreneurs acquired formal ICT education, but many have self-taught themselves, for example, aspects of ICT, web/mobile development, and multi-media (Ngoasong, 2018).

By utilising the power of ubiquitous internet, they identify underutilised or discarded digital resources/assets—which can be in the form of digital artifacts such as 'codes' already developed elsewhere, and then mix, and re-mix, re-combine, edit with their complementary skills-sets to develop a fully functional value-driven digital solutions (Naudé & Liebregts, 2020; Von Briel et al., 2018), but also require complementary digital skill-sets. Please see an example from the interview extract from a Maputo-based entrepreneur below:

> They asked, can you help us to sort this problem. I said now I have to think of a solution to build that, that's when I started to search and – I like to do things fast. I said, if I'm going to do this from scratch, it would take too much time, and I would be losing too much time on testing. And, clients at the end of the day, don't like to be the first users, they are the beta testers. I search everywhere; I find it in a piece of code that was already built. I gave a proposal for the owner of the code: Don't you want to sell me your code? Then I bought the code and start putting all my modifications: then adding all the needs that all other companies will need. (Founder in Maputo, cited in Friederici et al., 2020: 161)

As demonstrated above, several examples of digital bricolage abound in Africa, and this is likely to continue developing (Ngoasong, 2017), as a popular strategic posture and practice adopted by African digital entrepreneurs who prosper. Popular examples include using under-utilised pieces of codes (Friederici et al., 2020), harnessing mobile technologies and social media, online and offline bricolage (bridge) (Ngoasong, 2018). Given the above, we state the following propositions:

Proposition 1: *Entrepreneurs in Africa who adopt digital bricolage as a strategic*

Posture (Ability to coordinate under-utilised fragments of skill-sets and or digital

Artifacts) are more likely to develop a portfolio of mixed skill fragments for

Collaborative value creation and capture

11.4.2 Passion for Technology and Learning from Failure as a Strategic Posture-2

Competence includes skills as well as goal pursuit (Ngoasong, 2018). Thus, passion provides essential energy towards coherence and coordination of the goal pursuit (Cardon et al., 2009). A study of African entrepreneurs demonstrates how entrepreneurs without formal ICT education have engaged in self-study and learning by doing to develop

their digital competencies driven mainly by passion and a strong desire for new technologies (Ngoasong, 2017).

Passion provides intense positive energy for entrepreneurs to engage in the search for newer digital competencies. In so doing, the entrepreneurial passion provides 'consciously accessible, intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur' (Cardon et al., 2009: 517).

Passionate African digital entrepreneurs, in their rush to embrace new technology and or utilise it in exploiting opportunities in Africa, as well as the rush to be first trendsetters in Africa, fail early but cheaply—but frequently innovate afterwards (Sarasvathy, 2001; Taura & Radicic, 2019). Due to the hostile nature of their environment, they often encounter multiple failures along the way, but they remain undeterred, using the failure as a basis to intensify search or experimentation with newer combinations of resources—hence leading to more variety, and less uncertainty (McGrath, 1999).

While some quit after few failures, the most passionate African entrepreneurs persist, while learning from the failures and building vital digital skills to be utilised eventually (McGrath, 1999). While failure can be catastrophic, it also enables entrepreneurs to see things differently (McGrath, 1999). For example, failures enable intensified search more broadly in areas that might not have initially been intended or planned by the entrepreneurs (McGrath, 1999). It also reduces the uncertainties, should the entrepreneurs re-launch another digital enterprise after failure (McGrath, 1999).

The process of learning after a business failure for African entrepreneurs with a passion for technology enables them to learn multiple relevant digital skills from past experiences (Ucbasaran et al., 2013). Such accumulation from prior experiences, and leveraging of the human capital here in form of (digital competencies), enables entrepreneurs to develop portfolios through the subsequent launch of innovative products and services—frequently (Robson et al., 2012; Taura & Radicic, 2019). By becoming serial and portfolio entrepreneurs the negative impact of failing reduces, as the cost of failure could be spread, and also the option value available to them from their other

business undertakings is high in comparison to novice entrepreneurs (McGrath, 1999).

Although the failure rate of the business is high globally, it is higher in Africa comparatively due to institutional void, weak infrastructure among others (Adeboye, 1997; Fick, 2002; Robson et al., 2009). Also, given the hostile environment of doing digital business in Africa, the high failure rate of digital entrepreneurs could be transformed into an opportunity to preserve certain selective skills learned during the failed attempt for subsequent reproduction and accumulation (Aldrich & Reuf, 2006; Gluckler, 2007).

A high failure rate can be positive, provided that the cost of failing is limited such that high rates of business founding and exiting are associated with economic vibrancy (Birch, 1979). Also, through 'optimistic martyrdom', those who failed can signal new market opportunities for other more competent entrepreneurs (Kahneman, 2011). By adopting real options reasoning, they focus on the 'downside' instead of 'upside' to minimise costs through practices of, for example, re-selling the assets and repurposing the digital skills learned in the process, and they fall forward instead of backward (McGrath, 1999).

On the one hand, while passion (intense positive feeling) enables the African digital entrepreneurs to embark on a coherent goal pursuit of developing certain digital skills and competencies (Cardon et al., 2009). On the other hand, multiple early failures lead to the repurposing of learned digital skills by applying them in newly launched ventures to create new digital solutions and or artifacts (Robson et al., 2012).

This creates a branch-like structural shape with multiple repurposed branches of originally failed ideas. Such portfolio digitally competent entrepreneurs in Africa tended to exhibit enduring and strong skills competencies root. Given the strong root, they go ahead to re-launch new digital innovations and succeed eventually (Robson et al., 2012). Examples were found in a study of Ghanaian portfolio entrepreneurs—who experienced a higher degree of success when they launch innovations in comparison to novel entrepreneurs (Robson et al., 2012). Given the above, and by extension, we suspect that the skills acquired in building the portfolio of innovative digital ventures, as well as the learnings from

previous experiences of failures, can improve the likelihood of developing entrepreneurial digital competencies. Thus, we state the following propositions:

Proposition 2: *Entrepreneurs in Africa with a high degree of passion for technology*

(Ability to use intense positive feelings to pursue goals) and ability to learn from

Previous experiences of failure, are more likely to develop a

Coherent and robust digital portfolio of skills for creating and capturing value

11.4.3 Breadth and Depth of Digital Skills as Strategic Posture-3

External search strategies can give rise to the performance heterogeneity of firms (Laursen & Slater, 2006). Thus, it has become imperative for African digital entrepreneurs to develop a clear strategy of organising digital skills search through a 'depth' of (platforms) or 'breadth' across multiple (platforms) channels.

The arrival of digital technologies in Africa has transformed the environment of doing business and created newer opportunities; but at the same time have intensified the need for digital entrepreneurs to engage in active search for critical digital skills 'widely' and 'deeply' (Laursen & Slater, 2006). Previous studies on search, although insightful, have focused attention on knowledge and firm as the unit of analyses (Katila & Ahuja, 2002; Laursen & Slater, 2006). Most of such studies also focused on advanced Western economies.

We extend these studies by focusing on the search for digital skills pursued by African entrepreneurs, and how they utilised different strategies—to enable them to acquire critical digital competencies. For example, acquiring skills in fab labs or DIY Tech hub requires different pedagogic processes, compared to a University (Mounde et al., 2020). Following Laursen and Slater (2006), we focus on the external channels (in this case—suppliers of digital skills in Africa)—mainly Fab

or Maker spaces, Innovation and tech hubs, incubators/accelerators, University's, etc. (Mounde et al., 2020). To understand the effectiveness of search on these platforms/channels, we see each of them as a separate search space, requiring different organisation practices (Laursen & Slater, 2006). Thus, we developed propositions that provide insights on the importance of breadth and depth to external digital skills search in the African context/setting.

While external search 'breadth' focuses on the broad number of external sources and channels, the external search 'depth' focuses on the extent drawn/acquired deeply from the aforementioned external sources and channels (Laursen & Slater, 2006). The explosion of such skills centres in Africa can confound even the providers, and to a great extent, the target entrepreneurs—hence the need for a clear strategy to develop digital skills and competencies.

Organising skills through a breadth of multiple digital platform channels (skills provision centres) can be daunting especially for digital startups in Africa. The resource-constrained small digital firms in Africa are often faced with the difficult problem of 'attention allocation problem' (Ocasio, 1997).

Choosing the right mix of platforms to concentrate on for skills building by digital entrepreneurs in Africa requires a certain degree of managerial attention and commitment (Taura & Radicic, 2019). In an attempt to balance between internal vs. external strategies to acquire relevant knowledge as well as skills from numerous platform channels (skills provision centres) (Grimpe & Kaiser, 2010), the constrained resource base of the digital firm suffers (Taura & Radicic, 2019).

Scholars have suggested that a clear search criterion provides opportunities to choose among the variety of paths. African entrepreneurs, without or low levels of absorptive capacity who search digital skills broadly across all platforms, channels, and sources, are unlikely to succeed in developing the digital competence required for developing world-class digital solutions (Africa Trade Report, 2019; Banga & te Velde, 2018). Alternatively, the African digital entrepreneurs with high levels of absorptive capacity are the ones who succeed in developing a portfolio of complementary digital skills to create and capture value (Africa Trade Report, 2019; Banga & te Velde, 2018).

The African entrepreneur must develop the absorptive capacity to acquire and absorb technological knowledge in the digital age (Banga & te Velde, 2018). Otherwise, the entrepreneur runs the risk of being unable to leverage digitalisation and leverage out of low value-added activities (Africa Trade Report, 2019). Value creation and capture in the digital age are increasingly shifting towards intangibles (Africa Trade Report, 2019). In the process, low value-added opportunities will be lost, giving rise to new opportunities to be pursued in the higher value-added digital environments (Africa Trade Report, 2019). For example, it was reported that

> The cost of robotics and 3D printers is declining at 5-6% annually in developed countries such as the United States, while wages in developing countries are rising…A growing number of studies finds that robot cost in the United States will become cheaper than Kenyan formal labor by 2033…". United States might find it more cost-efficient to re-shore production back to US factories World Bank, 2017; Banga & te Velde, 2018 (cited in Africa Trade Report, 2019: 18)"

Given the above, entrepreneurs in African countries like Kenya who have made business process outsourcing (BPO) a core component of its national development strategy, 'Vision 2030' Republic of Kenya, 2007—would have intensified their higher value-added digital skills to complement their current skill-sets (cited Africa Trade Report, 2019).

Such entrepreneurs that develop their complementary digital skills transitioning from low to higher value-added are the ones fuelling the popular digital business model in Africa, which is based on the premise of 'repurposing' other digital artifacts to solve African problems (Friederici et al., 2020).

Given the changing nature of the economies to knowledge-based and increasingly digital, we suspect that African entrepreneurs, who invest time in developing a search strategy in its 'breadth' and 'depth' with the required absorptive capacity, will be the ones in a position to create value by acquiring, licensing, reverse engineering, and reassign jobs that might have been lost within the African ecosystem. Consequently, entrepreneurs with absorptive capacity who adopt breadth

posture, (ability to pursue digital skills development goal search from multiple digital skills provision centres), are more likely to develop a portfolio of complementary skills for creating and capturing value. On the other hand, the entrepreneurs with absorptive capacity who adopt depth posture, (ability to pursue digital skills development goal search from few digital skills provision centres), are more likely to develop a specialist skills-set for creating and capturing value. We state the following propositions for those who apply the oscillation strategy:

Proposition 3: *Entrepreneurs in Africa with absorptive capacity—who adopt oscillation*

Strategy (moving in between breadth and depth postures together) are more

Likely to develop a portfolio of balanced rounded skills for creating
And capturing value

11.4.4 Co-Evolution of Digital Skills as a Strategic Posture-4

Entrepreneurs' ability to select relevant skills, accumulate/retain, as well as replicate enables them to consciously develop relevant adaptive skills and competencies in line with current and digital futures (Breslin, 2008; Peneder, 2001). However, adaptive skills are not sufficient in a rapidly changing digital environment (Murmann, 2013). Hence, some African digital entrepreneurs adopt a co-evolutionary way of thinking to enable them to develop as a whole with the entire digital ecosystem that evolves (and grows) as well partake in shaping the total ecology of socio-technical systems (Clarke et al., 2014; Graham, 1998; Susan & Acs, 2017).

The co-evolution perspective approaches the discreteness of boundaries between agency (the entrepreneurs) and structure of the system as non-existent (Clarke et al., 2014). This allows for the relational and bi-directional digital entrepreneurial competencies growth, alongside other actors in the digital ecosystem (the suppliers of digital skills, regulators, rivals, and future generations), each continually producing the other (Clarke et al., 2014). The co-evolution perspective is vital as it promotes

the ecological balance of the system (Clarke et al., 2014). In addition, it emphasises mutually shared cumulative assets/resources based on relationships at a level of total ecology (Clarke et al., 2014).

Prosperous digital entrepreneurs in Africa are the ones who utilise the network in which they are embedded, as a locus of their digital innovativeness (Nambisan & Sawhney, 2011; Pittaway et al., 2004). In so doing, they co-evolve with other agents within the same network structural equivalence or knowledge domain (Nooteboom, 1994). They take an active role in shaping their network formation and reproduction over time, of digital platforms in the ecosystem (Jack & Anderson, 2002: Susan & Acs, 2017).

They can utilise their information and critical digital skills to filter the contents of relations and exchanges in their entrepreneurial settings, taking into consideration the network of relationships in the digital ecosystem (Jack, 2010; Tidd & Bessant, 2009; Susan & Acs, 2017). This leads to the reproduction of their network structure, helping them to the accumulated social capital of digital competencies—to create and capture values in the network structural holes (Burt, 2000; Walker et al., 1997). It is within the context of these network activities (formations and reproductions) over time that African digital entrepreneurs drive the co-evolution of their digital innovations.

The average digital entrepreneurs in Africa adopt what we have termed the digital 'hoping' survival strategy in which they jump from one skill-set to another without the careful mapping of relatedness of the knowledge bases (Taura & Watkins, 2014). Such actions lead to a 'hodgepodge' of un-related digital skills, making it more difficult to coordinate a meaningful relationship between the skills in ways that enable them to create and capture values (Lepak et al., 2007; Shane & Vankataraman, 2000). Sometimes, the hodgepodge skills can be cognitively distant instead of proximate—hence creating higher level coordination costs which the entrepreneurs can barely afford (Taura & Radicic, 2019).

Hence, African digital entrepreneurs who map their key skills attributes and use them in shaping the digital ecosystem bi-directionally with other actors are more likely to succeed (Susan & Acs, 2017). By utilising certain co-evolutionary levers—such as commercial ties and exchange of personnel entrepreneurs, can develop 'foresight' (Murmann,

2013). This is vital as connecting with digital futures—enables the entrepreneur to develop the cumulative absorptive capacity now, to prepare them for digital skills of the future. Co-evolution is compatible with more recent theorising on mastering expert entrepreneurialism and effectuation focusing on shaping and controlling the future (Sarasvathy, 2001; Sarasvathy et al., 2008).

Digital entrepreneurs who are able to design organisations that can design their future environments will be the ones with the highest degree of digital competencies (Sarasvathy, 2001; Sarasvathy, 2003). Their hindsight provides the basis for developing foresight skills to prepare for digital futures. Their perspective approach to probing the future enables them to develop competent digital procedural memory of skills (Walsh & Ungson, 1991). Procedural memory is memory 'for how things are done' or memory for 'things you can do' (Walsh & Ungson, 1991). Therefore, procedural memory involves skills or routines (Walsh & Ungson, 1991). A key characteristic of procedural memory is that it becomes automatic or accessible unconsciously—hence referred to as motor memory (Walsh & Ungson, 1991). In addition to the preparedness of the future, when the opportunity arises from the digital futures, such entrepreneurs are positioned well in such a way to improvise speedy and coherent actionable decisions for creating and capturing value (Walsh & Ungson, 1991). Thus, given the above, we believe

Entrepreneurs in Africa who adopt co-evolution as a strategic posture
(Ability to bi-directionally select, accumulate, and replicate digital skills)
are
More likely to develop cumulative readiness skill to improvise
Digital solutions for creating and capturing value

The above tool/matrix (Fig. 11.1) is intended to guide African digital entrepreneurs to diagnose, monitor and plan (short and long-term) their digital skills and competencies postures. It is a practical tool developed from a constellation of entrepreneurial action and strategic option literature.

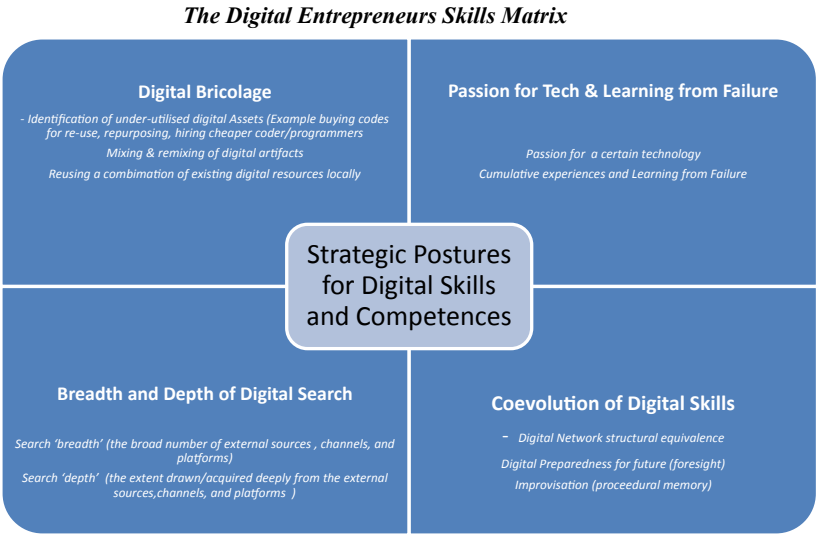

Fig. 11.1 The Digital Entrepreneurs Skills Matrix (*Source* Author's Diagram)

11.5 Conclusion and Future Research

This chapter made a vital contribution to our understanding of the digital skills deficiency in Africa within the context of digital entrepreneurship practice. Thus, the chapter examined the emergence, scope, and concept of digital entrepreneurship in Africa. The chapter concludes that, although the emergence of the concept of digital entrepreneurship has impacted the creation of new ventures and the transformation of existing businesses in Africa, the full potentials are yet to be realised. Africa has the potential to be one of the leading global digital entrepreneurial ecosystems if the digital skills deficit can be tackled effectively.

Africa should intensify efforts to strategic skills development, including (re-skilling, and or up-skilling), to encourage digital entrepreneurs, and intrapreneurs on the continent to develop digital competencies.

Given the broad scope of vital digital skills required for African entrepreneurs to thrive, including information digital skills, critical

thinking digital skills, problem-solving digital skills, creative digital skills, African entrepreneurs must learn to approach digital skills development as a strategic asset. The development of digital skills is an active, not a passive process. It is also an essential element of the entrepreneurial process in the digital age.

In line with mode-2 theoretical advances (creating knowledge in the context of application), the chapter concludes with a summary of the digital skills matrix. The goal is to enable African digital entrepreneurs as well as stakeholders of skills provisioning in Africa to use the matrix as a tool to diagnose, map, and strategically plan their digital skills and competencies development. The main limitation of the study is that it is mainly conceptual—relying on available evidence of practices published. Going forward, future research should focus on testing the stated propositions as well as developing a more comprehensive matrix. The propositions can be tested using quantitative approaches or developing the propositions into a full-blown theory of digital entrepreneurship and skills in Africa by conducting interviews with digital entrepreneurs or experts.

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