



Digital Transformation in West Africa: A two country, two-sector analysis

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Abstract

Purpose – This study explores opportunities and challenges of accelerating digital entrepreneurship development in key economic growth sectors in West Africa.

Design/ Approach/Methodology – The study uses case illustrations from the media and agriculture sectors to highlight some of the opportunities and challenges that have shaped current business practices in this digital space in West Africa.

Findings – Technological infrastructure featured as one of the main challenges for fostering success in the media-tech cases and perhaps linked to the low internet penetration rates. Likewise, infrastructure proved to be a challenge in the agri-tech sector cases.

Originality/ value – This study highlights the importance of partnerships within the entrepreneurship ecosystems as a critical condition for ensuring positive benefits for all stakeholders within the entrepreneurial ecosystem taken from the lens of West Africa.

Keywords: Agricultural Technology, Digital Transformation, Entrepreneurial Ecosystems, Media Technology, West Africa, Ghana, Nigeria

1. Introduction

The continent of Africa is characterised by a plethora of complex events such as military conflicts, political uncertainty, and unemployment with associated food shortages, societal inequality as a result of gender imbalance, poor quality education and digital illiteracy, - all present the reality for the most of countries in the Sub-Saharan Africa (SSA). However, we are witnessing new business models and approaches created and implemented to overcome such events and trigger unique opportunities for the regional development. As Madichie (2016) noted, these innovative solutions are largely fragmented. Joseph, Erasmus & Marnewick (2014) also previously argued that many innovative entrepreneurial ventures fail due to inability to execute projects and the lack of very critical for the entrepreneurial success soft skills.

Digitalisation through both the adoption and use of digital technologies present transformative prospects for the cultivation of the entrepreneurial ecosystem (Asongu & Nwachukwu 2018). Digital technologies enable flow, openness and accessibility of information and communication that indeed breakdown barriers to education, shaping independent thinking and fostering self-employment practices. It is also paramount to highlight that digital technologies are means to express “aspirations and senses of being in the world” (Pijnaker & Spronk 2017). In other words, adoption and use of digital technologies in the SSA, on one hand, enables social and economic change due to ability to capture cultural

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3 traditions and legacy as well as all contextual intricacies of the region. On the other hand, it
4 enables connectivity with much more developed practices and experiences elsewhere.
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6 Dana *et al.* (2018) pointed out that despite predictability and theoretical assumptions
7 of the impact digital technologies on entrepreneurship, research on digital entrepreneurship in
8 SSA remains either scarce or exudes limited understanding of the potential contribution of
9 digital entrepreneurship on economic growth and societal benefit. Consequently, this study
10 explores what opportunities and challenges of accelerating entrepreneurship in SSA as
11 mediated by digitalisation. It does this by drawing upon insights from two key, but oft
12 neglected sectors (i.e. media and agriculture) on the continent and with a focus on two West
13 African economies – Ghana and Nigeria.
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22 **2. African entrepreneurship: Theoretical background**

23 Entrepreneurship is a social technology for creating business opportunities (Welter *et al.*
24 2017). In addition to the common perspective on defining entrepreneurship, various studies
25 (i.e. Tvedten *et al.* 2014; Ratten & Jones 2018) argue that entrepreneurship is a solution to the
26 economic and social problems in parts of Africa. It is due to independence and control
27 perceived to be an ultimate outcome of any entrepreneurial activity. This enables the
28 improvement of the quality of life, as well as develops communities that are inspired to
29 achieve industrial growth. It is, therefore, not surprising to see that Africans have “the highest
30 entrepreneurial intent globally” (Reid *et al.* 2015, p. 264).
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38 However, such entrepreneurial intent is not converted in to a number of successful
39 business ventures because of the geopolitical nuances, discussed in the introductory section,
40 but also mistaken beliefs of the entrepreneurship being a ‘way of making it’ in the society
41 that lacks educational and employability prospects (Ferreira *et al.* 2017).
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45 Moreover, abundance of institutionalised, state-owned, and controlled enterprises in
46 SSA creates barriers in terms of availability of financial investments and lack of self-
47 confidence in creating new start-ups and small business activities (Edoho 2016; Ratten &
48 Jones 2018; Madichie, Nkamnebe & Ekanem, 2020). It is, therefore, clear that an
49 institutionalised support via investments, education provisions and structural support for the
50 entrepreneurship are inevitable criteria for increasing entrepreneurial activities in SSA.
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55 In understanding what makes entrepreneurial ventures successful in SSA, it is
56 important to first explore the cultural and historical nuances that set aside this region of the
57 world (Tvedten *et al.* 2014). Despite the popularity of SSA entrepreneurship in the media,
58 there is still a lack of understanding in the academic literature about how it is different
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3 compared to other geographical locations (see Table 1). An individual country and sectorial
4 insights within the region are necessary to expand our knowledge on the region.
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8 **Take in Table 1.**

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11 Lately, few studies explored impact of various socio-political and institutional aspects on
12 entrepreneurial activities in SSA. One of these is study by Hain & Jurowetzki (2018)
13 emphasised the importance of foreign direct investments into the entrepreneurship
14 ecosystems of SSA. In particular, such investments are found to increase longevity of the
15 start-ups and contribute to resources and capabilities enhancement in the entrepreneurial
16 businesses that provide technical innovations of global significance. Such innovations are
17 developed at the intersection of global and local knowledge (Madichie *et al.* 2019).
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24 Boojihawon & Ngoasong (2018) not long ago focused on the entrepreneurial digital
25 competencies and its effect on success of digital entrepreneurial ventures, taking into account
26 limited resources of an African country, Cameroon. It was highlighted that the information
27 and communication technology infrastructure, transport and local distribution infrastructure
28 and training opportunities to develop the entrepreneurial digital competencies are key to
29 fostering digital enterprises' development and growth. Shemi & Procter (2018) followed up
30 on this and focused on social commerce adoption in the context of small and medium sized
31 enterprises (SMEs) using a contextualism theory. It was clear that in the SSA context, social
32 media networks such as Facebook are increasingly used to enable transactional or trade
33 exchanges with no barriers for entry but enthusiasm to carry on entrepreneurial practices in
34 less resource intensive technological context.
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44 In addition to focus on digitalisation, several recent studies (i.e. Ukanwa *et al.* 2018;
45 Gudeta & Van Engen 2018; Nziku & Struthers 2018, Taura *et al.*, 2019) looked into women
46 entrepreneurship in particular. Ukanwa *et al.* (2018) highlights that females in rural areas are
47 particularly vulnerable and disadvantaged group; hence, entrepreneurship has potential to
48 change such dynamics and empower this deprived social group. It was found that many
49 women could combine household responsibilities can be combined with an opportunities to
50 earn living wage.
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55 However, microfinance options and process of obtaining are not tailored to limit
56 barriers for women in rural areas. There are also social and cultural aspects that prevent
57 women in Africa to take on risk and start a business venture (Nziku & Struthers 2018;
58 Madichie, Nkamnebe & Ekanem, 2020). Many women rely on views and opinions of their
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3 immediate social circles when many are discouraged to commit to self-employment as it
4 presents more risks and uncertainty rather than employment with a larger organisation.

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6 Finally, other cultural context such as Ethiopia limit opportunities for women to
7 maintain work-life balance, hence discourage women to start own businesses and even 'be
8 brave' to undertake any employability (Gudeta & Van Engen 2018). It is evident that many
9 of barriers now longer seen to be true for western economies remain reality for the SSA
10 region and at the same it is also clear that cultural differences present unique opportunities for
11 the entrepreneurial miracles in the region, learning from which can benefit the rest of the
12 world.
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20 21 **3. Entrepreneurial Ecosystems**

22 The entrepreneurial ecosystem approach have recently emerged as a benchmark for
23 implementing policies leading to a healthy and thriving critical mass of digital enterprises.
24 Entrepreneurship ecosystem scholars have argued that, an entrepreneurial setting rich in
25 thriving ecosystem leads to more productive entrepreneurial output (Stam, 2013; Mason &
26 Brown, 2014; Mack & Mayer, 2016; Alvedalen & Boschma, 2017). A healthy ecosystem is
27 pivotal to thriving entrepreneurship and economic development (Sheriff & Muffatto 2015).
28 Entrepreneurship ecosystem has been heralded as one of the few entrepreneurship approaches
29 to recognise both the central role of 'entrepreneurial actor' and the 'strategic context' of the
30 productive enterprise system (Stam, 2013). This enables the approach to integrate both
31 evolutionary and strategic approaches making it an ideal candidate for application to
32 quintessentially African settings (Sheriff & Muffatto 2015).
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41 Sceptics, however, argues that entrepreneurship ecosystem approach has
42 shortcomings since it is concerned with a complex system of interdependent parts considered
43 as dichotomous binary relationship of 'either/or' logic instead of 'both/and' (Clarke *et al.*
44 2014). Having said that, scholars argue that it has more benefits than shortcomings since, in a
45 typical African context its potential to capture the specificity and idiosyncrasy of local
46 systems is well pronounced (Sheriff & Muffatto 2015). When applied in digital settings, it
47 has the power to generate insights about knowledge exchange flows (energy), and venture
48 capital (nutrient) necessary for an enduring and dynamic digital system of enterprise.
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55 Unfortunately, despite the potential to generate insights, African research rarely
56 evaluates the challenges and prospects of entrepreneurial ecosystems especially in digital
57 environments of emerging less developed countries (Kantis & Federico, 2012; Taura *et al.*,
58 2019). Notable exceptions include Sheriff & Muffatto (2015) who conducted a cross-
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3 examination of the present state of the entrepreneurial ecosystems in four African countries
4 namely Botswana, Egypt, Ghana and Uganda. Despite limitations of available data their
5 study reveals the need to extend the frontiers of entrepreneurship research to encompass
6 national ecosystems. They further pontificate that that “entrepreneurship ecosystems could
7 be useful road maps for the formulation of entrepreneurship policies for countries in Africa.”
8 (Sheriff & Muffatto 2015). Other relevant studies argues that most African entrepreneurship
9 research focuses on describing state of entrepreneurship and its attributes instead of capturing
10 the coexistence and interactions between entrepreneurship, environment, and policy making.
11 Entrepreneurship ecosystem held the promise to enable us understands the dynamic inter-play
12 between the key players (agents), digital environments/spaces, and their interconnectedness
13 or otherwise in emerging developing countries. It has the potential to become the cornerstone
14 for formulating future digital and enterprise policies in Africa.
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26 **4. Design/ Approach/ Methodology**

27 For the purpose of this study, the multiple case approach was adopted. Multiple cases
28 (Rowley 2002) from different sectors affected by the digitalisation in SSA, media (hereafter
29 media-tech) and agriculture (hereafter agri-tech), present the sample. Multiple cases with
30 combination of empirical interviews and retrospective analysis of secondary interviews are
31 widely used in the research concerning entrepreneurship (Chandler and Lyon 2001). Table 2
32 presents full details on the sample.
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43 **Take in Table 2.**

44 Most respondents were in ‘media-tech’ and linked to Nigeria while three of the five
45 respondents in ‘agritech’ were Ghana-based ventures. Multiple data collection approaches
46 were used to profile the cases, including primary and secondary interviews with business
47 owners and employees. Both thematic analysis (Braun and Clarke 2006) and content analysis
48 (Elo & Kyngäs 2008) were drawn upon in interview data analysis with the aim to highlight
49 the challenges and opportunities of accelerating entrepreneurship in SSA as a result of
50 digitalisation.
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5. Discussion of Findings

The study finds, and presents the range of challenges and opportunities of accelerating entrepreneurship as a result of digitalisation, identified across media- and agri-tech sectors. These themes are analysed starting with the challenges and then moving on to the opportunities.

5.1 Challenges

Media-tech

Technological infrastructure featured as one of the main challenges for fostering success amongst studies companies. It is was not surprising to see this aspect highlighted as Nigeria and the whole SSA region lag behind on technological advancements and quite low Internet penetration rates. Moreover, quality of mobile network connectivity is diverse throughout Nigeria leaving many rural areas being inaccessible and reliant of fixed network connectivity. This was also highlighted by Bolat (2019) in her review of challenges faced by media SMEs in Nigeria. As confirmed by Madichie *et al.* (2019), within Nollywood cases it was also clear that production, distribution and marketing of content are seen as challenging due to “*disorganised*” approaches associated with commercialisation of film and media products. This is where corruption and self-interests of individual industry players overtake the benefits and progress of the entire ecosystem.

Being a historical characteristic of the most Nigerian business environments (Cage 2015), corruption remains one of the main challenges to accelerating growth of modern Nigerian tech-businesses. This is closely linked to sources of funding available to businesses willing to digitalise and benefit from new opportunities presented to tech-infused media businesses. Although number of funding opportunities is much more diverse today than a decade ago, limited amount of funding available and heavy reliance of foreign sources of funding restricts Nigerian media-tech businesses to expand and grow their operations and profitability (Bolat 2019; Madichie *et al.* 2019; Madichie, Nkamnebe & Ekanem, 2020). Indeed, this creates tensions within the industry and fosters corruption. For instance, in the case of Nollywood, it is clear that marketing is not seen as specific area of attention and hence monetary investment. This in turn prevents films to be distributed and hence monetised.

Agri-tech

Infrastructure was the main challenge highlighted by all cases from the agri-tech sector. Access to the Internet, “lack of mobile connectivity and bandwidth”, “lack of electricity in remote communities” prevented many of tech solutions to be deployed and considered by the farmers. This is not surprising result but of course a challenge, without resolving which the progress in deployment of agri-tech cannot be achieved. This particular finding is in line with Acheampong (2019). Only recently, Garba (2019) discussed the slow pace of applying technology, particularly digital technology in agriculture in Sub-Saharan Africa taking farming as a case illustration. He concluded that overall, there is no significant private sector initiative in the drive to develop, domesticate and or adopt and apply digital or other forms of technology in agriculture in Nigeria. This was also true for cases studies in this paper. Large firms in agriculture are mostly foreign owned and import much of the technology they require from overseas. Institutional barriers are evident in preventing the support for smaller firms with acquiring needed tech but also fostering innovation in domestically and regionally produced agri-tech.

5.2 Opportunities

Having highlighted the challenges, we now turn to the opportunities in these sectors.

Media-tech

The mindset of the first reported firm, ‘Mobil first,’ was largely highlighted by the advertising businesses as presenting particular opportunities for the Sub-Saharan region due to limitations of overall technological infrastructure. It is clear that in terms of overcoming distribution and marketing issues associated with commercialisation of content, marketing platforms are seen as main channel to push the media products and services. As Bolat (2019) suggests such focus could help to streamline the production and distribution and enable much more focused approach to who are critical actors within the commercialisation ecosystem.

Indigenous practices of using and deploying technology are clearly in place amongst all of the cases we studied. This is as a result of cultural nuances but also unique talent available in the SSA region. Culture is largely important to inspiration and purpose of media-tech cases. Embracing social causes, producing stories that discuss differences of SSA is what presents great competitive advantage for media-tech businesses in Nigeria (Cage 2015; Bolat 2019; Madichie *et al.* 2019). This combined with the latest globally accepted media production skills and approaches (coming from graduates who obtain foreign qualifications),

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3 but with portrayal of unique stories definitely was highlighted as a differentiation point that is
4 of interest not only to the SSA market but media audiences worldwide.

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6 The expansion and use of *networks*, were seen to be valuable to all of the cases
7 analysed in this study. This is not surprising because SSA culture is known for its partnership
8 culture. However, as previously discussed, this is in neighbourhood with self-interests and
9 corruption behaviour. Hence, such tensions should be resolved first. Indeed, the list of
10 challenges and opportunities identified from the investigated cases within the media-tech
11 sector in particular, demonstrate that although skills, partnerships and networks could
12 advance further all current efforts in the industry via available talent, established partnerships,
13 key element of preventing such advancements to take place – technological infrastructure – is
14 yet to be established in Nigeria. Furthermore, some of historical and cultural nuances
15 accompanied by corruption use limits of the infrastructure to own benefits, hence, slowing
16 any positive progress for business beneficiaries. Change in mindsets is what should happen
17 first, in order for the ecosystem to develop and see legitimacy as vitamin for successful grow
18 of media-tech businesses in SSA (Taura *et al.* 2019).

30 31 *Agri-tech*

32 There are indications that innovation in agricultural activities requiring the deployment of
33 digital tech, play a significant role in fighting poverty, lowering per unit costs of production
34 (Kassie *et al.* 2011), as well as in boosting rural incomes and reducing hunger (Maertens &
35 Barrett 2013; Acheampong & Hinson 2018, Acheampong 2019). However, many farmers
36 continue to face economic pressures – both micro and macro – with negative impact on farm
37 productivity (Boere & van Kooten 2015). This is especially visible in the ever-increasing
38 divide between urban and rural localities. This implies that agriculture needs to increase
39 innovation and technology adoption in rural remote areas. As with the media-tech, ‘mobil
40 first’ mindset was emphasised by the agri-tech cases. It was clear that all of the opportunities
41 identified in the deploying tech to assist famers come from the needs to access and transmit
42 data, communicate, complete transactions in the remote, time and location-sensitive context.

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44 Digital transformation was clear opportunity highlighted by the studies agri-tech
45 businesses. However, it was evident from all the cases that digital transformation needs to
46 happen within a wider agri-tech ecosystem that includes conventional agribusinesses, i.e.
47 farms, but also tech solution providers, players controlling technological infrastructure,
48 governmental and non-governmental organisations. It was apparent that partnership mentality
49 is needed to establish the ecosystem and digital transformation come to fruition. For instance,
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3 A2 highlighted the role of agricultural research institutions in recommending sophisticated
4 technological solutions to farmers in Ghana. In addition, research institutions play role in
5 evaluation of developmental needs farmers have in regard to using and understanding agri-
6 tech solutions. This is critical for not only the deployment of tech but also in decision-making
7 process regarding the impact of tech resources in accelerating the growth of agricultural
8 businesses – as pointed by case A3, “nurturing agricultural entrepreneurship and growth”. It
9 is apparent that with the introduction of technology, entrepreneurial intent amongst farmers in
10 Ghana was lifted as the access to networks and resources and direct interaction with various
11 agricultural stakeholders was enabled. This particular result is similar to what Klerkx *et al.*
12 (2010) found in terms of positive impact technology use and adoption had on innovation and
13 entrepreneurial intent.
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24 **6. Conclusions and Implications**

25 Two sectors were examined in this study and they both highlight similarities in regard to the
26 challenges and opportunities faced by the entrepreneurial firms in the digital space in SSA. It
27 is clear that developments in infrastructure is the main issue to be resolved before any
28 deployment of digital tech to become mainstream and benefit businesses. Moreover,
29 entrepreneurship ecosystems are critical to stimulating entrepreneurial intent to deploy
30 technology, acquire skills and engage with opportunities offered by digital tech (Sheriff &
31 Muffatto 2015). The African Development Bank Group (2019) did point out that productivity
32 can only “be achieved if constraints to doing business such as poor governance, low
33 institutional quality, and inadequate infrastructure” will no longer limit “firm survival and
34 dynamism”. Our findings confirm this claim.
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43 It was not too long ago that McKinsey (2019) reported that in Africa “for someone to
44 find a consumer, you need to have a local partner who knows where the consumer is, based
45 on very subjective information”. This study has also highlighted the importance of
46 partnerships within the entrepreneurship ecosystems and critical condition for the positive
47 benefits for all stakeholders within the ecosystem. In today’s competitive business
48 environment, it is clear that both the media and agricultural technology (agri-tech) sectors see
49 benefits in deploying digital tech. Hence, both sectors play significant role in economic
50 developments of SSA. It is clear that digital tech provide media-tech and agri-tech businesses
51 with opportunity to take into account the regional nuances of societal, institutional and
52 geographical nature.
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Table 1. Sample studies

Author/ Year	Title	Country
Chege & Wang (2020).	The impact of technology transfer on agribusiness performance in Kenya.	Kenya
Acheampong (2019).	The Nature of Corporate Digital Agricultural Entrepreneurship in Ghana.	Ghana.
Igwe, P. A., Madichie, N., & Newbery, R. (2019).	Determinants of livelihood choices and artisanal entrepreneurship in Nigeria	Nigeria
Boojihawon & Ngoasong (2018).	Emerging digital business models in developing economies: The case of Cameroon.	Cameroon
Azumah, Donkoh & Awuni (2018).	The perceived effectiveness of agricultural technology transfer methods: Evidence from rice farmers in Northern Ghana.	Ghana
Hain & Jurowetzki (2018).	Local competence building and international venture capital in low-income countries: Exploring foreign high-tech investments in Kenya's Silicon Savanna.	Kenya
Eberhardt & Vollrath (2018).	The effect of agricultural technology on the speed of development.	South Korea
Feder & Savastano (2017).	Modern agricultural technology adoption in sub-Saharan Africa: A four-country analysis.	Ethiopia, Niger, Nigeria, Tanzania
Pamuk, Bulte & Adekunle (2014).	Do decentralized innovation systems promote agricultural technology adoption? Experimental evidence from Africa.	Africa
Abebaw & Haile (2013).	The impact of cooperatives on agricultural technology adoption: Empirical evidence from Ethiopia.	Ethiopia
Muzari, Gatsi & Muvhunzi (2012).	The impacts of technology adoption on smallholder agricultural productivity in sub-Saharan Africa: A review.	Africa
Asfaw, Shiferaw, Simtowe & Haile (2011).	Agricultural technology adoption, seed access constraints and commercialization in Ethiopia.	Ethiopia
Kassie, Shiferaw & Muricho (2011)	Agricultural technology, crop income, and poverty alleviation in Uganda.	Uganda
Uaiene, Arndt & Masters (2009).	Determinants of agricultural technology adoption in Mozambique.	Mozambique
Minten & Barrett (2008).	Agricultural technology, productivity, and poverty in Madagascar.	Madagascar
Alzouma (2005).	Myths of digital technology in Africa: Leapfrogging development?	Africa
De Janvry & Sadoulet (2002).	World poverty and the role of agricultural technology: direct and indirect effects.	Africa, Asia, and Latin America
Doss (2001).	Designing agricultural technology for African women farmers: Lessons from 25 years of experience.	Africa
Arndt & Tarp (2000).	Agricultural technology, risk, and gender: A CGE analysis of Mozambique.	Mozambique
Negatu & Parikh (1999).	The impact of perception and other factors on the adoption of agricultural technology in the Moret and Jiru Woreda (district) of Ethiopia.	Ethiopia
Oehmke & Crawford (1996).	The impact of agricultural technology in Sub-Saharan Africa.	Africa
Adesina & Baidu-Forson (1995).	Farmers' perceptions and adoption of new agricultural technology: evidence from analysis in Burkina Faso and Guinea, West Africa.	Burkina Faso and Guinea.

Table 2. Case Profiles

Case ID	Industry details	Sector	Country
A1	Agri-tech software	Agri-tech	Ghana
A2	Market research	Agri-tech	Ghana
A3	Crowdfunding	Agri-tech	Ghana
A4	Engineering	Agri-tech	Nigeria
A5	Rice processing mills	Agri-tech	Nigeria
M1	Advertising	Media-tech	Nigeria
M2	Games	Media-tech	Nigeria
M3	Data analytics	Media-tech	Nigeria
M4	Nonprofit all-inclusive media production	Media-tech	Nigeria
M5	Nollywood	Media-tech	Nigeria
M6	Nollywood	Media-tech	Nigeria
M7	Nollywood	Media-tech	UK/Nigeria
M8	Nollywood	Media-tech	Nigeria