

# Building place-based innovation capabilities for productivity in Sub-Saharan Africa

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## Introduction

The characteristics of places shape the success of innovative activities and have consequences for productivity growth. Sub-Saharan African economies are no exception. What makes the region so particular is a combination of several factors. There are the weak institutions and poor policy coordination; the lack of skilled labor and basic infrastructure; the predominance of low value-added activities; the informality; and the highly volatile markets and socio-political conditions.<sup>1</sup> Unfortunately, recent regional crises have worsened the prevailing conditions for starting up and doing business in many places, both within and across borders.

On a more optimistic note, the continent of Africa as a whole has significant growth prospects; it is host to the world's youngest population and has tremendous resources. Local startup ecosystems have never been so blooming and interconnected, thanks to a rapid adoption of information and communication technologies (ICTs). Nevertheless, a closer look at productivity changes reveals that the Sub-Saharan region continues to record the lowest outputs in terms of productive entrepreneurship, and stands well back from the frontier with respect to traditional productivity indicators. Successive editions of the *Global Innovation Index* – including the present 2022 edition – underline the fact that most Sub-Saharan African economies have been consistently underperforming on both the innovation input and output sub-indices. Relatedly, national firm-level data remains a scarce resource, often non-existent when it comes to measuring innovation and entrepreneurial activities.

This paper acknowledges that innovation can lead to quantitative and qualitative productivity enhancements under certain conditions. It begins with an overview of key empirical findings on the links between innovation and productivity in Sub-Saharan Africa, then explores a unique qualitative study on Ci20, a West Africa-based startup consortium.<sup>2</sup> Like other places in the region, several barriers limit the ability of Ci20's startup firms to develop and bring new products, processes, organizational and commercialization methods onto the market, even though they operate in one of the region's most resilient and fastest growing economies, namely, Côte d'Ivoire. The linkages with their local innovation ecosystems are also instrumental for Ci20's innovation performance and the subsequent impacts on local economies and communities. Our concluding remarks are a reminder that many of the elements integral to enhancing productivity through innovation are at present missing from the Sub-Saharan region of Africa.

## Innovating for productivity in Sub-Saharan Africa

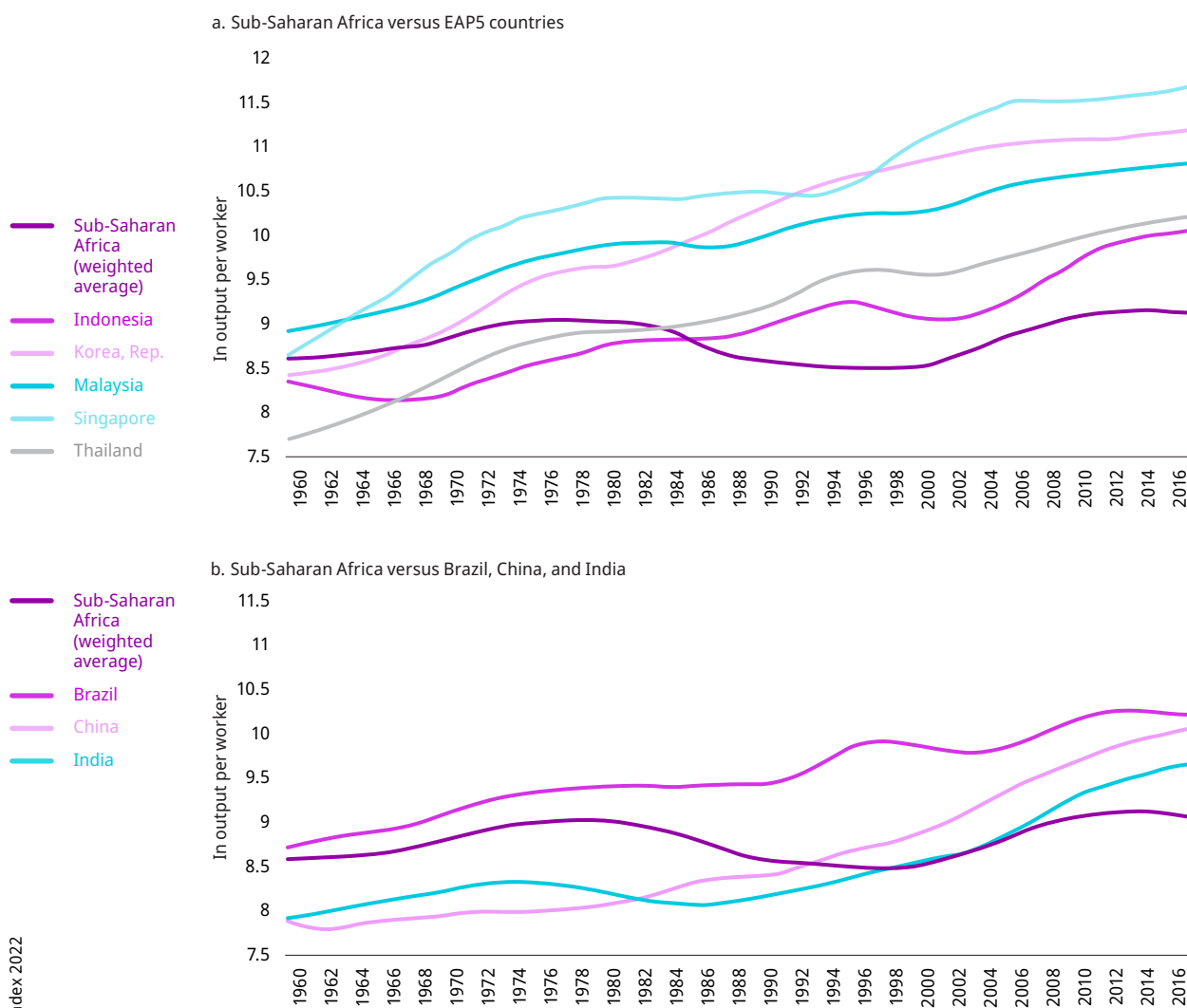
### Productivity in Sub-Saharan Africa: Between stagnation and decline

The adoption of structural change agendas by many governments in Sub-Saharan Africa underlines the policy attention paid to the modernization of industrial and economic fabrics,

and to the transition toward higher value-added and innovative activities. Indeed, during the last decade, Sub-Saharan Africa has witnessed noticeable improvements – albeit socially and geographically concentrated – in innovation investment and networks, and in the ability of local ecosystems to adopt and diffuse new technological knowledge. However, these positive signals have not yet translated into sustainable productivity gains for the dominant agricultural sector, nor for the region’s traditional industries and millions of micro, small and medium-sized enterprises (MSMEs). Neither has the health shock that is the COVID-19 pandemic improved the situation, leading to greater market uncertainty that has tended to impede productivity growth.

Sub-Saharan Africa finds itself in the lower reaches of productivity growth and structural transformation. The Calderón report, “Boosting Productivity in Sub-Saharan Africa,” published by the World Bank, assesses the productivity performance of the region against a global efficiency benchmark and an aspirational development standard. This global benchmark is the United States of America (US), which stands at the technology frontier. The aspirational development standard is the group of five East Asian economic “dragons” (the EAP5 or “East Asian 5”), namely, Indonesia, Malaysia, the Republic of Korea, Singapore and Thailand. In contrast to the EAP5, Sub-Saharan Africa’s labor productivity has dropped from about 13 percent to 7.7 percent, when compared to the technology-frontier economy, the United States. The region has also lost its edge in a direct comparison with the EAP5 and other dynamic emerging markets, such as Brazil, China and India (Figure 7.1). The picture is similar when one looks at other traditional indicators, such as production efficiency and the relative capital–labor ratio or the stock of physical capital per worker.<sup>3</sup>

**Figure 7.1 Labor productivity in (a) Sub-Saharan Africa versus EAP5 and (b) Sub-Saharan Africa versus Brazil, China and India, 1960–2016**



Sources: Calderón (2021, p. 5), citing the Penn World Table (PWT) 9.0 and PWT9.1 updates (Feenstra *et al.*, 2015).

Notes: The figures plot the natural logarithm (ln) of the output per worker of each country or group. Calculations use the output-side real GDP per capita at chained purchasing power parity (PPP) rates (in USD, millions, at 2011 prices). The figure presents the Hodrick-Prescott permanent component of the output per worker (in logs). ln = natural log.

Important causes of the stagnation or decline of aggregate productivity in Sub-Saharan Africa are to be found in the capabilities and structures of the region's economies, which are oriented toward low-value agricultural activities, weak governance and poorly functioning policies and institutions. It is these policies and institutions that define the "rules of the game."<sup>4</sup> By doing so, they influence the patterns of technology diffusion and innovation across sectors and firms, affecting both productivity and economic performance.

### **Transparent "rules of the game" for innovation-driven productivity improvements**

Between 2010 and 2019, very few African countries were able to raise the quality of their overall governance. As illustrated by the Ibrahim Index of African Governance (IIAG), the continent has even recorded declines for the IIAG dimensions of "Security & Rule of Law" and "Participation, Rights & Inclusion."<sup>5</sup> In parallel, the continent has improved with regard to the "Foundations for Economic Opportunity" and "Human Development," although at a rate that has been slowing since the mid-2010s. On overall governance, Sub-Saharan African economies such as Comoros, Malawi, Mali and Nigeria and to a lesser extent Cameroon, South Africa and Zambia, have deteriorated even further. Deteriorating and non-transparent "rules of the game" take the form of heavy regulation, high levels of corruption, underdeveloped financial markets, market instability, preferential rules, lack of trust in public institutions, among others. Importantly, this can hamper the ability of local firms to absorb or diffuse new knowledge and technologies, which in turn may prove detrimental to productivity and economic growth.

Recent works shed light on the positive link between innovation and productivity in the context of Sub-Saharan African economies, thanks to an increasing availability of internationally comparable survey data.<sup>6</sup> These data suggest that well-performing financial markets and institutions impact not only the innovation investment decisions made by firms, but also their productivity by bringing in more resources for ICT adoption and innovation. Firm innovations make a difference for effective entrepreneurship, total factor productivity (TFP) and labor productivity in the contexts of Sub-Saharan Africa, whereas research and development (R&D) does not appear to be the most relevant innovation indicator. Despite being significantly positive, the odds are not equal for all types of innovation – i.e., new or significantly improved products, production processes, business support processes, organizational and management practices, and marketing methods – and depend on the degree of novelty as well. Likewise, the poor quality of institutions and entrepreneurial ecosystems appears to hinder productive entrepreneurship, because this tends to undermine innovation activities.

In addition to well-performing and transparent "rules of the game," other factors have been identified as key drivers for innovation in emerging and developing countries, especially in Sub-Saharan Africa. ICT use,<sup>7</sup> technology adoption, skills availability and access to external knowledge come up as robust enablers for different types of innovation, while also influencing the productivity of local firms. The impact of these factors seems to be even stronger in the Sub-Saharan region.

In the next section, we look through the lenses of African ICT-enabled startup firms in order to explore further the obstacles to innovation. The discussion relies mainly upon existing startup monitoring reports and a newly conducted, original qualitative study on a startup consortium located in Côte d'Ivoire, West Africa (see Box 7.1). Through this study, we hope to stimulate further systematic analyses and policy monitoring on the Sub-Saharan region's rapidly expanding tech-ecosystem.

#### **Box 7.1 Survey on the Ci20 startup network in Côte d'Ivoire (West Africa)**

Côte d'Ivoire Innovation 20 (Ci20) is a consortium of 15 startup firms whose core activities rotate around ICT-enabled solutions, but which nevertheless operate in various sectors, such as agriculture, construction, education, entertainment, financial and insurance activities, human health and social work activities, sewerage, utilities, waste management, water supply and other service activities. Eleven were granted the Presidential Excellency National Prize and the consortium itself has received more than 80 international prizes.

Ci20 startup firms were all legally and independently created during the tech-ecosystem boom decade of the 2010s, with the youngest startup established in 2021. Twelve are headquartered in Côte d'Ivoire (two in rural areas) and three in the United States. Five firms are single-shareholder companies. Ci20 firms claim to have more than 300 employees jointly and a combined turnover of over 10 million euros in 2021.

We used the European Commission-funded EUSurvey tool to design online forms for our survey. A total of 15 forms were completed and 11 semi-structured interviews conducted during April 2022 with the main founder of each startup firm (CEO, Director General or President). The survey was aimed at improving understanding of (i) the firms' innovation profiles and challenges and (ii) the nature of their ecosystem linkages and the impact of their innovations.

### Topics covered in the survey on Ci20 startup firms

| Legal information   | Innovation profiles   | Impacts of innovations  |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Registration details</li> <li>• Shareholders, ISIC sector(s)</li> <li>• Turnover, employees and gender representation</li> </ul> | <ul style="list-style-type: none"> <li>• Forms of innovation</li> <li>• Sources and barriers to innovation</li> <li>• Means of legal protection (intellectual property)</li> <li>• Creativity and innovation processes</li> </ul> | <ul style="list-style-type: none"> <li>• Innovative goods and services</li> <li>• Impacts on local agricultural and industrial sectors</li> </ul> |

The 15 surveyed ICT-enabled startups were:

|                 |              |                    |             |
|-----------------|--------------|--------------------|-------------|
| Canaan Land     | Etudesk      | JooL International | Panelys     |
| CinetPay        | Grainothèque | Legafrik           | Pass Mousso |
| Coliba          | ICT4DEV      | Lifi-Led           | SkanTicket  |
| Digitech Africa | Innoving     | Mon Artisan        |             |

Source: Ci20, see at <https://www.ci20.org/les-membres-1>.

Note: ISIC is International Standard Industrial Classification.

## Barriers to innovation in Sub-Saharan Africa's digital startups

### Regional funding for prototyping, demonstration activities and market expansion

Although research on African startup firms is limited, the few studies or surveys that do exist confirm a lack of access to funding to be one of the most common barriers to innovation. This often results from either absent or restricted opportunities (in terms of sources and volumes) for funding at different stages, a privileged or limited access to funding information, or insurmountable credit and loan requirements.

In contrast, funding from international donors, global tech corporations, angel investors and venture capital (VC) firms for African digital ecosystems has reached unprecedented levels in the last decade. Current estimates for the year 2021 go well beyond USD 4 billion, but with a very skewed geographical distribution that makes Kenya, Nigeria and South Africa the region's top beneficiaries (see also the GII 2022 Tracker Dashboard on VC deals and value). US and Europe-based organizations are the main fund providers, but new actors are emerging from Brazil, China or Japan. The total amount received is double 2020's funding values, two-thirds of which went to financial technologies companies (FinTech). Likewise, Africa-based innovation hubs are increasingly attracting funding for the implementation of entrepreneur and business support-oriented programs. They offer onsite and online value-adding services, including incubation and scaling-up support, coaching and mentoring sessions, financial literacy and managerial capacity-building, investment readiness programs, networking and financing facilitation, all helping to boost innovative startups and growing companies.<sup>8</sup>

About two-thirds of the Ci20 startup firms surveyed declared major fund-raising operations in the previous three years (see Box 7.1). The funds raised supported either the development of innovations or novel business models.

Some of the Ci20's fund-raising operations are disclosed in thematic public media online,<sup>9</sup> such as for the digital finance platform Cinetpay, which raised USD 2.4m seed funding. Others, such as JooL International, engaged in international mergers and acquisitions (M&As), for example, the recent acquisition of French startup firm Drone Hive.

Yet, such examples of successful fund raising barely reduce the huge regional (startup) funding gap. To do so would require that Sub-Saharan African governments step in strategically to boost the development of their tech-ecosystems. Indeed, a lack of adequate funding features as the first barrier to innovation faced by Ci20 startup firms. What is more telling concerns the type of funding needed by such firms in order to improve innovation processes, market reach and create more value. From this perspective, the *Global Innovation Index 2020* asks "Who will finance innovation?" and in so doing provides many insightful messages.<sup>10</sup> Chapter 2 by Peter Cornelius in that volume outlines a comprehensive taxonomy of funding sources for entrepreneurship and innovation. Importantly, this taxonomy identifies different categories of finance – own and non-debt/equity, debt and equity funding – depending on the startup firm's life cycle (respectively, seed, early stage, expansion, later stage, growth and maturity).

A majority of the Ci20 startups have overcome the seed stage, reporting financing barriers especially with respect to product development and commercialization, scaling up and expansion into regional and international markets. Similar barriers are underlined in startup surveys targeting Rwanda and South Africa, two of the continent's top tech-ecosystems.<sup>11</sup> More specifically, the Ci20 startups have unmet funding needs with regard to producing prototypes and demonstrating them in the laboratory and in real environments. Some often have to travel to China or France in order to access testing and prototyping facilities and technical platforms for the pilot phase, which necessarily increases R&D costs related to travel expenses. There is also limited funding for field trials or agricultural inputs testing through controlled facilities or farm networks, as well as for related IT infrastructure. In the agricultural sector, for instance, execution in the field, sampling and laboratory analyses may all require specific equipment often inaccessible in a startup firm's local area. Testing, piloting and demonstration are all key to the successful development and commercialization of new products, since they validate the proof of concept.

### **Skill gaps and regulatory barriers**

In addition to financial barriers, the restricted availability of talents and competences, as well as the shortcomings of legal and institutional business frameworks, are cited frequently by survey respondents as obstacles to innovation.

Ci20 startup firms, like many of their African peers, find it difficult to find talents and skills from within their local ecosystems. Moreover, they increasingly face losing employees to other firms and market actors, often entailing a "brain drain" of in-house trained professionals. Skills shortcomings are diverse in nature, depending on the sector in which the startup firm operates. One key insight from Ci20 is startups' despair at being unable to readily access technical, marketing and managerial skills. Retaining talents is another major issue. Such is the case for technical functions carried out by developers, data analysts, new technologies specialists (AI, blockchain and so on), legal experts, intellectual property (IP) specialists and, to a lesser extent, sales employees. Startup firms are often left with very few options. Either they strengthen the capabilities of their own technicians or staff, or else rely on freelance consultants or foreign expertise. So far, traditional national education and training systems have struggled to meet startups' need for talents and skills.

Sub-Saharan Africa's legal and regulatory frameworks are among the world's worst performing, when it comes to doing business.<sup>12</sup> The burden of regulations, administrative procedures related to tax, property and exports, together with a weak judiciary, inadequate enforcement mechanisms and corrupt practices, are impeding not only innovators, but MSMEs more generally. More specifically, Ci20 startup firms report experiencing challenges concerning regulation and policies, for example, those relating to tax, as well as to financial regulation uncertainty, time-consuming administrative procedures, lax enforcement of regional agreements, a lack of adequate or operational private-public partnership frameworks and an absence of proper academia-startup cooperation frameworks, as well as legal voids regarding new tech sectors (such as FinTech).

What is more, policies are often complex, lengthy and poorly communicated, thus limiting the alignment and adhesion of ecosystem actors. This is certainly the perception of some firms, for instance, regarding Côte d'Ivoire's first ever released national policies for digital development, innovation and cybersecurity, as well as key regional and global agendas, and agreements generally.

## Boosting productivity through innovation

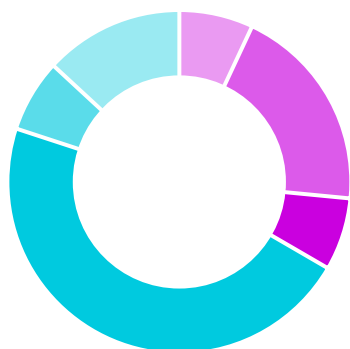
Ci20 firms mostly develop new or improved services or processes protected mainly through trademarks. Four make use of patents, mainly granted by the regional organization, the African Intellectual Property Organization (OAPI), although additional IP routes are being explored (for instance, National Institute of Industrial Property (INPI) in France or the United States Patent and Trademark Office (USPTO)).<sup>13</sup> Two of the 15 Ci20 firms hold multiple patents and combine them with industrial designs. In terms of frequency, about two-thirds of the Ci20 firms surveyed had introduced three or more innovations during the previous three years (Figure 7.2).

A growing number of startup firms and innovation hubs does not guarantee a higher firm survival rate, nor the sustainability of tech-ecosystems. Collaboration and linkages between firms is key for the generation and commercialization of innovations. These include links with other firms and supply chain links, as well as relationships established with customers, professional associations, knowledge organizations, and local and national governments. Relevant linkages can positively impact innovation and productivity by facilitating knowledge flows, technology diffusion and market validation.

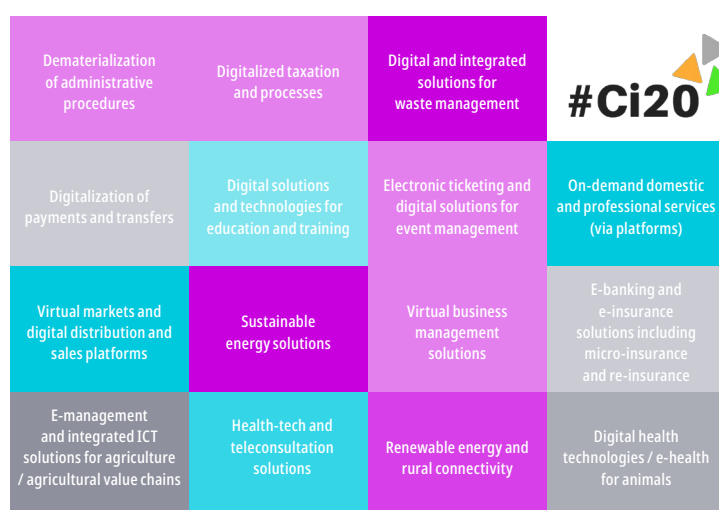
**Figure 7.2 Innovations introduced by Ci20 startup firms in the previous three years**

a. Minimum number of innovations (frequency)

- 3 innovations 46%
- 4 innovations 7%
- 5 innovations 13%
- 2 innovations 7%
- 1 innovation 20%
- None 7%



b. Examples of innovations introduced in the market



Source: Author's elaborations from the survey results.

With regard to the sources of information for innovation, Ci20 firms prefer to look for this from internal sources, including from founder(s), employees, internal databases and R&D activities. One reason for this relates to the fact that internal information is easily accessed, and part of the information sought may be tacit knowledge among collaborators. Interestingly, a majority of the consortium's firms had actual processes and tools in place for stimulating team creativity and generating fresh ideas. Semi-structured interviews allowed us to obtain more insights into these processes and tools. Although most firms were unable to quantify their efforts or expenditures on R&D and innovation activities, they did have internal processes for generating ideas for new products or improvements to existing ones. These processes appear to be very firm-specific. They can be either structured around dedicated and regular collective brainstorming and brainwriting sessions, market and technology watches, backlogs and personal searches, or else remain rather non-structured and in response to new market opportunities detected by one of the main executives, including the founder(s).

The Organisation for Economic Co-operation and Development (OECD) Oslo Manual provides detailed guidelines for the measurement of innovation in different sectors of the economy. It distinguishes between internal and external sources of innovation. Besides other affiliated business enterprises, the external sources include unaffiliated business enterprises (suppliers, knowledge services providers, customers, competitors, investors), government (including regulations, standards, websites, repositories and databases, and so on). They also cover higher education institutions, private non-profit organizations and other sources, such as trade fairs, conferences or publications.<sup>14</sup> The interviewees for the study were asked to choose between similar categories. Questions about sources and barriers were a main focus of both the questionnaire and the interviews.

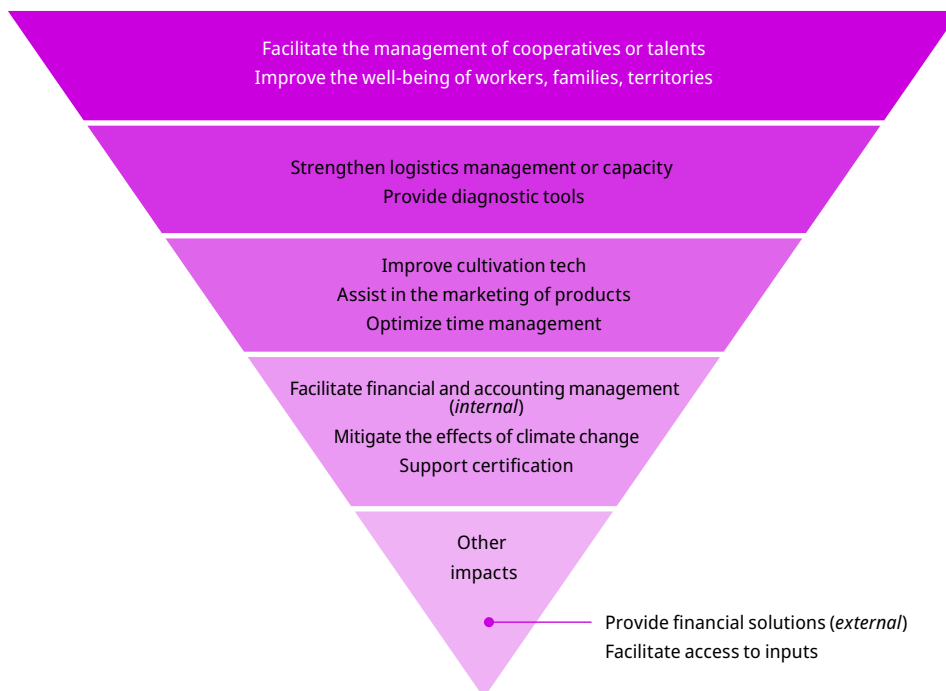
When considering external information sources, it is foremost to their clients that Ci20 firms first turn, with six also citing the international competition as a source. Of lesser importance were technical universities, mostly those dedicated to teaching science, technology, engineering and mathematics (STEM) or ICT-related subjects, and professionals. Finally, neither government, through its agencies, nor very traditional universities were perceived as important sources of information for innovation. On the other hand, technical universities (i.e., non-traditional), such as the National Polytechnique Institute Félix Houphouët-Boigny (INPHB), the African Higher School of ICTs (ESATIC) and the Virtual University of Côte d'Ivoire (UVCI) were the main local sources of future collaborators for the Ci20 firms. They are also a key source for ideas through industrial attachment programs (PhDs and Master's students, mainly).

Firms' innovations may have little impact, unless adopted or diffused more broadly beyond the place of creation to other places, sectors, companies and organizations. The innovativeness of Ci20 products is acknowledged by the tech-ecosystem, including investors and donors, as illustrated by the significant number of national, regional and international prizes and awards received. In fact, Ci20's market reach extends beyond Côte d'Ivoire's borders. Ci20 firms are active in sub-regional markets (Economic Community of West African States (ECOWAS)), seven have entered other African markets, while five firms have recorded sales at international level (for instance, in Europe).

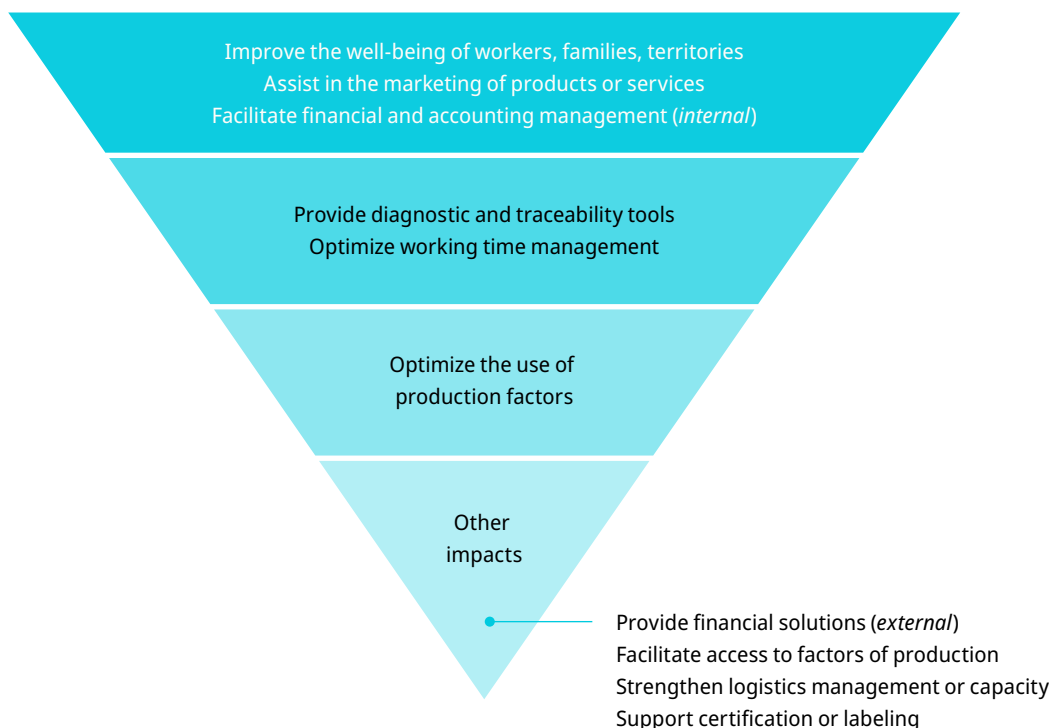
Ci20 startup firms also link with large and locally-listed companies, such as Compagnie Ivoirienne d'Électricité (CIE, power supply), Orange Côte d'Ivoire SA (telecommunications operator), Servair Abidjan CI (airplane catering), Société Ivoirienne de Raffinage (SIR, oil refinery). Most such companies are listed among the top performing large companies in West Africa or at the continental level.<sup>15</sup> Ci20 startup firms provide them with new technological solutions in various domains (Figure 7.3). From a business-to-business perspective, they also offer solutions to local small and medium-sized enterprises (SMEs) and micro-firms, and their services extend well beyond traditional sectors and the formal economy, bringing innovative solutions into rural areas and communities for workers or craftsmen operating in the informal sector (see GII 2022 Expert Contribution from Braga de Andrade, Cosentino and Sagazio),<sup>16</sup> farmers' co-operatives, professional and industrial associations, including major ones such as the Coffee Cocoa Council (CCC).

**Figure 7.3 Startup firms' perceptions of Ci20's innovation impacts on the (a) agricultural and (b) industrial sectors**

a. Impacts on the agricultural sector



b. Impacts on the industrial sector



Source: Author's elaborations from the survey results.

Note: Most important items selected by Ci20's startup firms at the top, the least important at the bottom.



## Concluding remarks

Building place-based innovation capabilities is essential for sustainable productivity growth. To escape productivity stagnation, Sub-Saharan Africa will have to intensify efforts toward improving the policy understanding, quality and scope of financial markets for innovation and technology development. Moreover, enforcing transparent “rules of the game” is as important as the design and updating of policies in allowing innovative and productive firms to prosper.

Training and retaining talent constitutes a major roadblock to the development of local tech-ecosystems, including with respect to new technology professionals (in the fields of AI, blockchain, and so on). National and regional thematic programs give cause for optimism. But they are still marginal, when compared to the thousands of social sciences and humanities graduates entering the African job markets every year.

Data and evidence are not only key to informed policy decisions, they are instrumental for the innovative activities and long-term strategies of firms. For the startup firms interviewed as part of our survey, their related needs are as diverse as their operations. They include data on industrial and agricultural value chains; innovation and (digital and green) technology diffusion; genetic material for agriculture; and e-repositories for locally-produced knowledge.

Social and institutional stability is no less important for sustainability. Recent international and regional conflicts are once again undermining the processes of development, and with that the hope of trade integration and growth promised by the African Continental Free Trade Area (AfCFTA). At present, scenarios for and the odds of a productivity revival through innovation hold much uncertainty in many places in Sub-Saharan Africa.

## Notes

- 1 Ohnsorge and Shu, 2021; Dosso *et al.*, 2021; Dana *et al.*, 2018. Half of the world’s most fragile states are on the continent and Sub-Saharan Africa has the highest level of output and employment informality within the group of emerging market and developing economies (Ohnsorge and Shu, 2021). See also the GII 2022 Expert Contribution from Braga de Andrade, Cosentino and Sagazio on Brazil.
- 2 For more details, see <https://www.ci20.org>.
- 3 Calderón, 2021; Feenstra *et al.*, 2015.
- 4 The “institutions-as-rules” approach follows Douglas North’s article distinguishing between formal or explicitly written institutions (laws, constitutions) and informal ones (conventions and norms) (North, 1990).
- 5 The 2020 Ibrahim Index of African Governance (IIAG) report. Data are available for download at: <https://mo.ibrahim.foundation/iiag/downloads> (accessed May 2022).
- 6 Xu *et al.*, 2021; Ajide, 2022; Kansheba, 2020; Morsy and El-Shal, 2020; Cirera *et al.*, 2016.
- 7 Similar results were found for selected Latin American countries concerning the positive effects of broadband adoption on innovation and productivity (Grazzi and Pietrobelli, 2016).
- 8 Afrilabs, 2021; Briter Bridges, 2021; Dosso, Braoulé *et al.*, 2021. Briter Bridges defines innovation hubs as support organizations that provide services including incubation and acceleration programs, coworking spaces and support structures for entrepreneurs. According to the research firm, at least 1,000 hubs were operating in 53 countries and over 200 cities across the African continent, by the end of 2021. About 45 percent of these hubs have support programs, while more than half represent coworking spaces and communities. See at <https://intelligence.briterbridges.com> (accessed May 2022).
- 9 See, for instance: <https://techcrunch.com/2021/12/08/4dx-ventures-and-flutterwave-back-francophone-africas-cinetpay-in-2-4m-round>.
- 10 Cornell University, INSEAD and WIPO, 2020.
- 11 See, Meier *et al.* (2020) for a survey on the Rwandan startup ecosystem. The second survey covers 1,000 South African startup companies. Available at: [https://www.seedengine.co.za/wp-content/uploads/2018/03/SeedAcademy\\_StartUpSurveyResults\\_2015.pdf](https://www.seedengine.co.za/wp-content/uploads/2018/03/SeedAcademy_StartUpSurveyResults_2015.pdf) (all weblinks accessed May 2022).
- 12 See the regional profile at: <https://www.doingbusiness.org/content/dam/doingBusiness/media/Profiles/Regional/DB2020/SSA.pdf> (accessed May 2022).
- 13 OAPI has 17 member states, mostly French-speaking, from Sub-Saharan Africa. More information can be found at: <http://www.oapi.int/index.php/fr> (accessed May 2022).
- 14 OECD/Eurostat, 2018.
- 15 See for instance: <http://observatoire-europe-afrique-2030.org/wp-content/uploads/2019/10/Top500-Jeune-Afrique-12102019-liste-des-entreprises.pdf> and [https://www.sikafinance.com/marches/le-top-20-des-plus-grandes-entreprises-de-cote-d-ivoire\\_28175](https://www.sikafinance.com/marches/le-top-20-des-plus-grandes-entreprises-de-cote-d-ivoire_28175) (accessed May 2022).
- 16 Kraemer-Mbula and Wunsch-Vincent (2016) on innovation processes in the informal sector.

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