PEDL Research Papers

This research was partly or entirely supported by funding from the research initiative Private Enterprise Development in Low-Income Countries (PEDL), a Foreign, Commonwealth & Development Office (FCDO) funded programme run by the Centre for Economic Policy Research (CEPR).

PEDL Twitter

Business incubators and entrepreneurship development in Africa's innovation systems: a bibliometric review

Abiodun Egbetokun

Faculty of Business and Law, De Montfort University, Leicester, UK

&

National Centre for Technology Management, Ile-Ife, Nigeria

Abstract

Business incubators are a policy tool for spurring and supporting entrepreneurial businesses. In recent years, many African countries have established many of them. Business incubators in Africa have received some attention in the academic literature but there are no systematic analyses of the body of evidence to help researchers make sense of what we already know and what remains to be known. Herein lays the purpose of this paper. Using standard bibliometric methods, this paper reviews the state of the art of the research in this area and identifies the gaps for future research. The analyses highlight the five major themes in the research literature on incubators in Africa: incubator types and support for different business types; incubator performance in fostering innovation and capability building; impact of incubators on businesses and the economy; role of incubators in supporting emergence and growth of start-ups; and incubators as enablers of firm-level learning. Some remaining gaps in the literature are identified. First, limited evidence exists on how to improve incubator support to businesses across sectors and countries. Second, barely any evidence exists on how to design and implement adaptive, responsive and inclusive incubation systems. Third, rigorous impact evaluations are conspicuously missing from the reviewed body of research. These gaps represent opportunities for future studies.

Keywords: business incubator, Africa, MSMEs, entrepreneurs

1. Introduction

In developing countries, micro, small and medium-sized enterprises (MSMEs) provide nearly 90% of all employment (Page and Söderbom, 2015). MSMEs therefore represent a key part of the solution to unemployment and poverty problems. However, these enterprises exhibit low levels of survival and productivity (La Porta and Shleifer, 2014). Business incubators are deployed as a vehicle for improving enterprise survival and growth (Chandra and Chao, 2015; Adegbite, 2001). As a policy option, incubators form part of an innovation system and focus on enterprises that already have growth potential, and aim to support their survival, growth and productivity.[1]

The academic and practitioner literatures identify several forms of interventions that are deployed to enhance business survival and growth in developing countries. These include interventions related to

i. direct funding (e.g., business grants and loans);
ii. capacity building (e.g., training on entrepreneurship, business management or the use of specific tools such as ICTs);
iii. market instruments (e.g., tax incentives, customs duties, and government procurement); and
iv. early-stage protection (e.g., business incubation)

Of these, business incubation is particularly interesting because it could easily function as a platform for the implementation of other types of interventions. For instance, Markley and McNamara (1995, p. 273) noted that business incubators act as a one-stop shop for access to "business assistance services, networking opportunities, and flexible, below-market rental space".

In a broad sense, the term *incubator* is used to describe an organisation that helps entrepreneurs to develop their business from ideation to the launching and early growth stages. This broad conceptualisation includes a wide range of organisations ranging from large real estate locations

[1] Some incubated firms in Nigeria have grown to become highly productive. Spectra Industries Limited (graduated from the oldest incubator in 1998) is a good case in point. Most success claims about incubator programmes in Africa use such examples. There is, however, a need to shift away from these 'outliers' to a systematic overview of incubator impact.

like technopoles and science parks, to the smaller brick-and-mortar business incubators, accelerators and innovation hubs. It also includes incubators without walls, that is, organisations that act as aggregators of business support services (Adegbite, 2001). In a strict sense, a *business incubator* differs from other types of incubators in that it provides business support and management services under one roof for entrepreneurs and new ventures (Akçomak, 2011). For this study, therefore, business incubators are those organisations that "supply joint location, services, business support and networks to early-stage ventures" (Bergek and Norman, 2008, p. 22) whether or not these ventures are technological. In several African countries like Nigeria, business incubators that focus on technological businesses are known as technology business incubators (Adelowo et al, 2012).

Incubators provide tangible benefits to firms, such as lower operating costs and access to services, and intangible benefits such as moral support, advice from other tenants and access to information (Siyanbola et al, 2012; Lalkaka, 2002; Allen and McCluskey, 1990). Akçomak (2011) notes that incubators are a remedy for the disadvantages that small and new firms encounter by providing numerous business support services and they are useful in fostering technological innovation and industrial renewal. He identifies five value additions that underlie the proliferation of incubators in developing countries, viz: to reduce start-up and early-stage operational costs, and the risk of doing business by providing a protective environment for start-ups; as a means of regional (technology) development policy; enhancing university-industry collaboration; stimulating networking among firms; reversing or preventing brain drain.

The literature on business incubators in developing countries is growing but remains small. Moreover, the literature is taking different directions. It is therefore critical to identify what we have learnt so far, what evidence is inconclusive, and what we still do not know enough about. The main purpose of this study, therefore, is to review the state of the art of the research in this area and identify the gaps for future research. To achieve this aim, I examine the current structure of incubator research in Africa by addressing the following pertinent questions:

1. To what extent is incubator research in Africa interconnected?
2. Which authors and research strands have most influenced incubator research in Africa?
3. What are the major themes in incubator research in Africa?

4. What are some of the open research questions in incubator research in Africa?

As methodology I adopt a systematic reviews protocol, a rigorous and transparent form of literature review. While there are previous reviews of incubator research in developed (e.g., Allen and McCluskey, 1990; Aernoudt, 2004) and developing (e.g., Akçomak, 2011) countries, most reviews focus on one or more narrowly-defined topics. To the best of our knowledge, no previous study makes use of a systematic review protocol to evaluate studies on business incubators in Africa. Existing reviews (e.g., Hacket and Dilts, 2004) mostly exclude studies focused on Africa, mainly because of the restrictiveness of the bibliographic databases used.

Yet, a focus on Africa is instructive. With 1.3 billion people as of 2018, it accounts for about 16% of the world's human population (UN-DESA, 2019a,b) and about 28% of all inhabited countries in the world. However, recent estimates in the World Poverty Clock (worldpoverty.io, accessed October 30, 2020) indicate that over 518 million people, that is 39% of Africa's population, were in extreme poverty as of May 2020 (live on less than $1.9 per day). Given the central role of the private sector in poverty reduction, it is useful to understand how to effectively support the survival and growth of private enterprises, beginning with an understanding of what works and what does not.

This study contributes to the literature on innovation systems and private sector development not just in terms of the review methodology used, but also in terms of scope. First, this is arguably the first systematic review of the evidence on the key themes in incubator research in Africa, as a way of organizing the fragmented nascent literature and as a seedbed for future studies. Second, the paper focuses on all of Africa and does not impose any geographical exclusion criteria. Third, there is an obvious gap in the literature regarding what is known and what remains to be known about incubators in Africa. As part of the summary of evidence that this paper provides, it sheds light on current themes and also offers some suggestions on what remains to be known about incubators, with a view to informing future studies.

This review focuses on conventional business incubators and not on other typologies including innovation hubs, science parks and accelerators. The conventional business incubator provides a

shared facility for new and young firms. It also offers business support services, networking opportunities and cheap rental space (Markley and McNamara, 1995). This type of incubators is attractive in the African context because they require relatively lower resources to establish and manage, and are therefore particularly well suited for private sector development in poor countries. Business incubators generally incubate firms in the industrial and services sectors, where developing countries could build productive capacity and a competitive advantage for economic growth in the coming decades.

The remainder of the paper is organized as follows. I summarise the methods in the next section before presenting and discussing the findings. The discussion of results begins with an overview of key aspects of the selected papers. The most notable of these aspects is that the body of research on incubators in Africa is small and recent but rapidly growing. A final section summarizes key lessons learnt from this exercise, provides directions for further research.

2. Methods

2.1. Sample Selection

The systematic literature review follows the PRISMA protocol (Page et al, 2021). Search was conducted on November 02, 2020 on *Dimensions*[2], a relatively new bibliographic database launched in 2018. The philosophy of *Dimensions* is to provide comprehensive coverage of the scientific literature (Herzog et al, 2020). This is particularly desirable for this study given the need to account for locally relevant research that may be missing from less comprehensive (even if well-known) data sources. That is not to say that *Dimensions* includes everything that other data sources exclude, but its broader coverage allows for a better representation of the scientific literature in under-researched areas. As Visser et al (2021, p.38) note, "The ideal data source provides comprehensive coverage of the scientific literature…and in addition also offers a flexible set of filters for making selections of the literature."

Dimensions is appealing for this study for three main reasons. First, it captures a wide range of research outputs including journal articles, proceedings, monographs, preprints and chapters. This makes it more inclusive than other well-known databases such as Web of Science and

[2] https://app.www.dimensions.ai/discover/publication

Scopus which have been previously critiqued for under-reporting research from Africa (Duermeijer et al, 2015) especially in the humanities and social sciences (Egbetokun et al, 2022). Second, apart from being larger than most, there is considerable overlap between *Dimensions* and other established data sources. In a recent detailed comparison, Visser et al (2021) reported 27 million documents in Scopus and 36 million in *Dimensions*. Of these, 21 million are common to both databases, which means that *Dimensions* contains most (78%) of what is included in Scopus and much more. Finally, it offers extensive flexibility in the processing of results. In addition to full-text search and abstract search, *Dimensions* offers dedicated filters for publication year, publication type, researchers, categories, open access, citation details and funding information. It also features an analytical view that provides, for instance, the total and average number of citations over the preceding 10 years to all items in the results list. The combination of its comprehensiveness, flexibility and overlap with other sources makes *Dimensions* an ideal data source for our analyses.

The process followed in selecting the studies finally included in this review is illustrated in Figure 1. I used each of the keywords *incubator* and *incubation* combined with each of Africa's countries and territories, including Western Sahara, Reunion and Swaziland to search in the title, keywords, abstract and full text of publications. I did not restrict the search by years because business incubators in Africa are a relatively recent phenomenon and so is the associated research. The database search initially returned 7913 results. These reduced to 127 when results were restricted to relevant disciplinary areas[3] including Human Society; Commerce, Management, Tourism and Services; Business and Management; Economics; Built Environment and Design as well as Policy and Administration. The excluded fields include, *inter alia*, Biological Sciences, Medical and Health Sciences as well as Veterinary Sciences. With the help of a research assistant, I screened the titles and abstracts of each of the 127 remaining articles and eliminated another 79 that did not focus on business incubators, leaving 48 studies finally included in the review (see Table 7 in the Appendix for a full list). The studies eliminated at this stage include those that focus on unrelated topics (e.g., concrete processing and mobile applications development) but that belong to one or more of the included disciplinary areas and

[3] Defined based on the Australian and New Zealand Standard Research Classification (ANZSRC) Fields of Research (FoR) categories; the default in the *Dimensions* database.

use one of the two main keywords at least once. For each of the 48 final studies, I stored the author(s), title, abstract, where published, year published, type of access and number of citations.

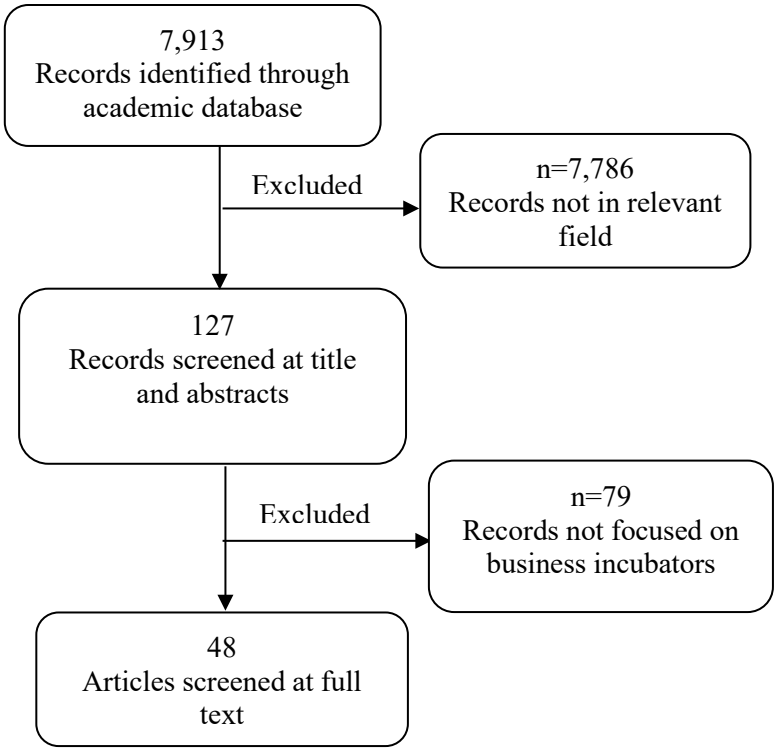

Figure 1: Workflow of the literature selection process

2.2. Data analysis

I applied basic bibliometric methods to the data obtained from the search using version 1.6.15 of VOSviewer, a free network analysis software (van Eck and Waltman, 2020). The analyses and presentation of the results are organised in tandem with the research questions outlined in the introduction, as follows.

i. Overview of incubator research in Africa: I describe the evolution of the literature in terms of publications per year and the outlets in which the research appears. I also summarise some citation indices, including the most cited papers and authors.

ii. Citation analysis: Two publications are connected by a citation link if either one cites the other. The citation network is the result of all such links. For the purpose of this study, the citation link is non-directional; in other words, a link is counted once

between two papers A and B whether A cites B, B cites A or they both cite each other. This approach helps to simplify the analysis and allows focus on the connectedness of the research on incubators in Africa.

iii. Bibliographic coupling: Two publications are said to be bibliographically coupled if they both cite a third publication. For instance, in a set of three papers A, B and C, both A and B are coupled if each of them made reference to C. There is thus a probability that A and B are related in terms of their subject matter. The bibliographic coupling network helps us to gain insight into the intellectual shape of incubator research in Africa to date.

iv. Co-citation analysis: A co-citation link connects two items that are both cited by the same document. For instance, in a set of three papers A, B and C, both A and B are connected by a co-citation link if C has referenced both of them. The network that results from all such connections gives us a view of the authors and intellectual traditions that have most influenced incubator research in Africa.

3. Results

3.1. Overview of business incubator research in Africa

Figure 2 shows the trend in the number of articles per year on the topic of business incubators in Africa. From a shaky start with an average of 1.3 articles per year between 1993 and 2012, the African business incubators literature experienced a rapid growth that started in 2013. More than 80% of all the articles included in this study were published between 2013 and 2020, with an average of 5.7 articles per year. Following a slight dip in 2019, a total of nine articles were published in 2020, the highest in any given year. This shows that research on incubators in Africa is still in its early stages and quite small but is rapidly growing, having expanded by 800% in the 27 years between 1993 and 2020.

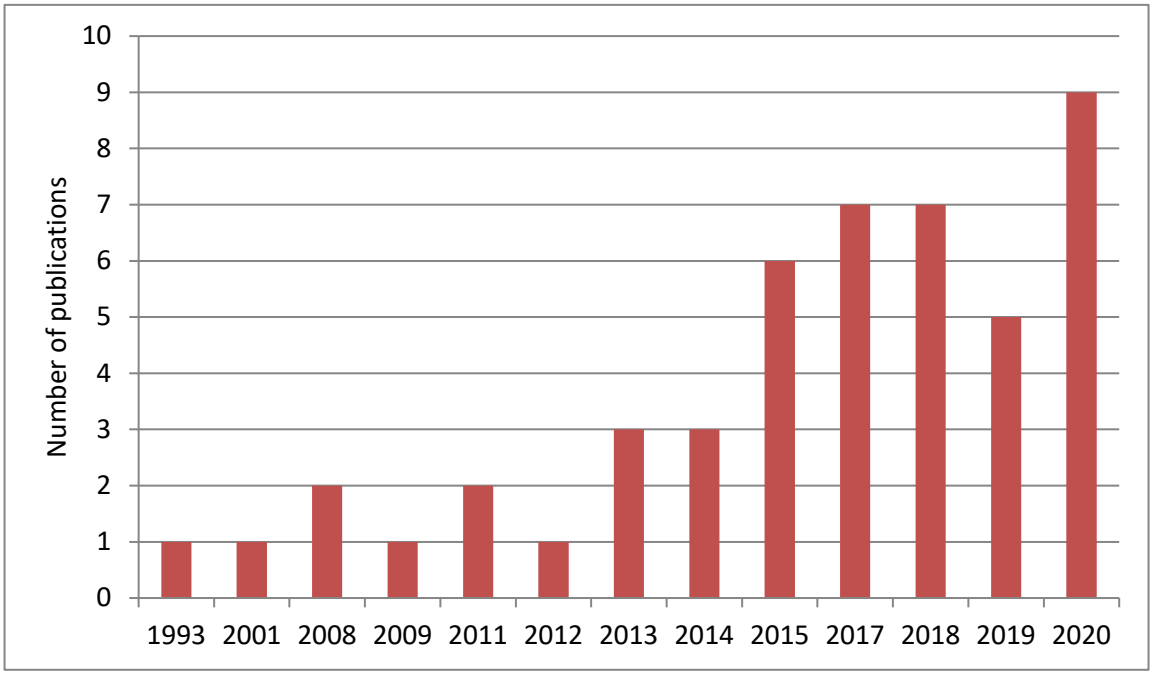

Figure 2: Number of studies per year

Table 1: Types of studies (n=48)

Access	**Number of studies**
Gold open access	23
Green open access	5
Closed access	20
Publication type	**Number of studies**
Journal article	43
Book chapter	5

As shown in Table 1, most of the published research on incubators in Africa is in the form of journal articles. Open access publications are particularly pronounced, gold open access articles being about half of all publications. This is interesting to note, considering the widely reported deficiency of research resources in sub-Saharan Africa especially in the social sciences (Egbetokun et al, 2022; 2020). A possible explanation for the large share of open access publications is that many authors in the sample are affiliated with institutions in South Africa or outside sub-Saharan Africa or South Africa where support for research and publishing is

comparatively better. Moreover, as shown in Table 2, several of the journals in which the publications appear are fully open access by default. Table 2 further shows that most of the journals feature only one article on business incubators in Africa. Excluding book chapters, only six of the journals published more than one paper on incubators in Africa since 1993: one has three papers and the remaining five have two papers each, together accounting for over a quarter of all 48 papers included in this study. Table 8 in the Appendix categorises the journals by fields of research and it comes out clearly but unsurprisingly that the research on African business incubators is concentrated in the fields of Business and Management (23 journals) and Applied Economics (8 journals).

As of November 2, 2020 when the search was conducted, 31 of the 48 papers included in this study have been cited a total of 162 times, for an average of 5.2 citations per paper. The ten top-cited papers have all received above average citations and together account for 75% of the total citations (Table 3). Moreover, it is instructive to note that most (50%) of these top-cited papers are gold open access and a further 10% is green open access. This is consistent with some studies that suggest a positive correlation between open access and citations (e.g., Eysenbach, 2006) and contrasts others such as Davis et al (2008) who found no such correlation. However, my finding is not definitive as I cannot rule out self-selection which, as argued by Gaule and Maystre (2011), could mean that authors of higher quality papers are more likely to choose open access journal *ex ante*.[4] After identifying top-cited authors, I confirmed their country of affiliation returned by *Dimensions* via a simple Google search of their exact names. The findings reported in Table 4 suggest that the top echelon of African incubators research is dominated by African researchers affiliated with institutions mainly in two countries: South Africa (54%) and Nigeria (38%). This could be a reflection of the sheer size of the R&D system in these two countries and their disproportionate contribution to research production in sub-Saharan Africa.

[4] Methodology may also play a role. Most studies that report a positive relationship between open access and citation rates are cross-sectional while most that find no correlation are either experimental or longitudinal.

Table 2: Number of publications by journal

Journal	Default Access	Number of studies
Books		5
African Journal of Science Technology Innovation and Development		3
African Journal of Business Management		2
Environmental Science & Policy		2
International Journal of Academic Research in Business and Social Sciences		2
International Journal of Research in Business and Social Science		2
Urbani Izziv		2
Africa Journal of Management		1
African Journal of Economic and Management Studies		1
Annals of the American Association of Geographers		1
Biotechnology (Faisalabad)		1
Bulletin of Geography Socio-economic series		1
Development in Practice		1
Development Southern Africa		1
Enterprise Development and Microfinance		1
Entrepreneurship Theory and Practice		1
Humanomics		1
International Journal of Entrepreneurship and Business Development		1
International Business Research		1
International Journal of Academic Research in Economics and Management Sciences		1
International Journal of Business Administration		1
International Journal of Fashion Design Technology and Education		1
Journal of Economics and Business		1
Journal of Entrepreneurship and Innovation in Emerging Economies		1
Journal of Entrepreneurship in Emerging Economies		1
Journal of Global Entrepreneurship Research		1
Journal of Intellectual Capital		1
Journal of Small Business & Entrepreneurship		1
Journal of Sustainable Development		1
Makerere Business Journal		1
Organization Science		1
Revista Eletrônica de Estratégia & Negócios		1
Small Business Economics		1
Sustainability		1
The Southern African Journal of Entrepreneurship and Small Business Management		1
Thunderbird International Business Review		1
Urban Forum		1
Total		**48**

Table 3: Top cited papers (greater than 5 citations)

Study title	Year	Access	Authors	Citations
Business Incubators and Small Enterprise Development: The Nigerian Experience	2001	Closed	Adegbite, Oyeyemi	38
The contribution of business incubators and technology stations to small enterprise development in South Africa	2008	Closed	Ndabeni, Lindile L	17
The Sustainability and Challenges of Business Incubators in the Western Cape Province, South Africa	2015	Gold	Lose, Thobekani; Tengeh, Robertson K.	12
Small enterprise development in South Africa: The role of business incubators	2014	Gold	Masutha, Mukhove; Rogerson, Christian M.	11
Fostering Technological Entrepreneurship for Socioeconomic Development: A Case for Technology Incubation in Bayelsa State, Nigeria	2011	Gold	Bubou, Gordon Monday; Okrigwe, Festa Ndutimi	10
An Evaluation of the Entrepreneurs' Perception of Business-Incubation Services in Kenya	2011	Gold	Meru, Abel Kinoti; Struwig, Miemie	8
Small business incubators: An emerging phenomenon in South Africa's SMME economy	2014	Gold	Masutha, Mukovhe; Rogerson, Christian M	7
Business-Incubation Process and Business Development in Kenya: Challenges and Recommendations	2015	Closed	Meru, Abel Kinoti; Struwig, Miemie	6
Beyond entrepreneurship education: business incubation and entrepreneurial capabilities	2018	Green	Ikebuaku, Kenechukwu; Dinbabo, Mulugeta	6
An empirical analysis of the effect of business incubation process on firm performance in Nigeria	2017	Closed	Iyortsuun, Akuraun Shadrach	6

Table 4: Top cited authors (greater than 5 citations)

Authors	Country of Affiliation	Times cited
Adegbite, Oyeyemi	Nigeria	38
Rogerson, Christian M.	South Africa	18
Masutha, Mukovhe	South Africa	18
Ndabeni, Lindile L	South Africa	17
Meru, Abel Kinoti	Kenya	14
Struwig, Miemie	South Africa	14
Lose, Thobekani	South Africa	12
Tengeh, Robertson K.	South Africa	12
Bubou, Gordon Monday	Nigeria	10
Okrigwe, Festa Ndutimi	Nigeria	10
Ikebuaku, Kenechukwu	Nigeria	6
Dinbabo, Mulugeta	South Africa	6
Iyortsuun, Akuraun Shadrach	Nigeria	6

3.2. Interconnectedness of African business incubator research

We now turn to the substantive question of the extent to which the few existing studies on incubators in Africa cite each other. Of the 48 papers included in this study, nine have been cited only once and 22 have been cited at least twice. Figure 3 shows the full citation network. Specifically, only 20 publications are in the largest connected component highlighted in the upper half and detailed in the bottom half of Figure 3. This connected component comprises 5 clusters as follows:

i. Cluster 1 is the largest with five publications which generally focus on how incubators help typically under-resourced enterprises and the challenges they face in the process. The conceptual overview by Ndabeni (2008) and sociological discussion by Pollio (2020) describe the typology of incubators, the services they offer and their importance in the private sector ecosystem in South Africa. Zooming in on the Western Cape Province, the qualitative study of Lose and Tengeh (2015) identified lack of sponsorship as well as limitations in geographical reach, production space and technology facilities as some of the challenges facing incubators in South Africa. Assenova (2020) shows that early-stage incubation and mentoring promotes learning, scaling and profitability among socially and educationally disadvantaged entrepreneurs in South Africa. Kapinga et al (2018) illustrate how business incubators facilitate training as well as market and business network access for female entrepreneurs in Tanzania. They also highlight the need for incubators to tailor their support to incubatees' needs in order to enhance incubation impact. All but one of these five studies are set in South Africa which probably explains why they cross-cited.

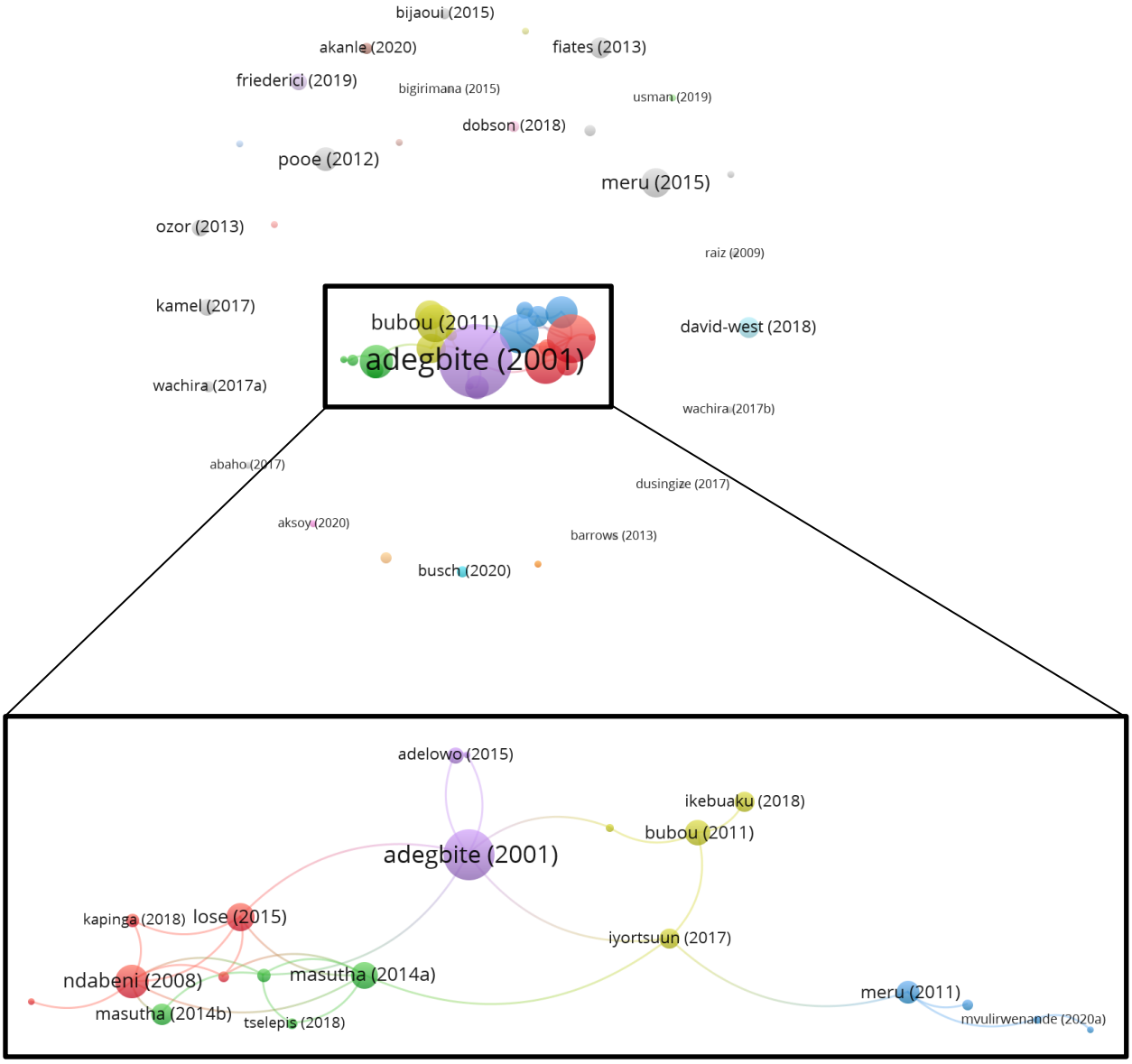

Figure 3: Citation network of research papers on business incubators in Africa, 1993-2020
Note: Each bubble represents one paper, each line represents a co-citation link and bubble size is weighted by citations

ii. Cluster 2 includes four studies in total, comprising three by Masutha and Rogerson (2015, 2014a,b) and one by Tselepis (2018). These studies are in the same citation cluster for two main reasons: the dominance of a single pair of authors who apparently have self-cited and the common focus on micro, small and medium enterprises (MSMEs) in South Africa. Specifically, Masutha and Rogerson (2014b)

cites Masutha and Rogerson (2014a), Masutha and Rogerson (2015) cites the two 2014 papers by the same authors while Tselepis (2018) cites Masutha and Rogerson (2014b). All studies consider the role of incubators in small and artisanal business development in South Africa.

iii. Cluster 3 with four studies is the most diverse in terms of geographical context. It has two multi-country studies by Mvulirwenande and Wehn (2020a,b) that analyse virtual incubator cases in Kenya, Ghana, Mozambique, Benin, Mali, Mozambique, Rwanda, Senegal and Ethiopia. The study by Briggs (2017) examined the support provided by business incubators in Tanzania from the entrepreneurs' perspective, and the study of Meru and Struwig (2011) performed a similar analysis in Kenya. These studies commonly highlight how different types of enterprises require different forms of support and incubators therefore need to be adaptive.

iv. Cluster 4 includes four studies that concentrate on the contributions of incubators to Nigeria's socioeconomic development through their catalytic role in enterprise development. Based on a case study, Bubou and Okrigwe (2011) suggest that technology incubators are a viable means of promoting technological entrepreneurship and consequently reducing poverty. Akhuemonkhan et al (2014) argue that the government-owned technology incubation centres in Nigeria have had "very weak socio-economic impact on job creation, wealth creation and industrial development in Nigeria." They recommend, among other interventions, the creation of incubators on the campuses of tertiary institutions. The paper by Iyortsuun (2017) is the only quantitative study in this cluster. Using data from a sample of firms within an incubation ecosystem, it highlights the need for strategies to build the capacity of the incubators offer intensive business assistance and professional management services to their incubatees. Ikebuaku and Dinbabo (2018) observe the limited impact of a government policy that made entrepreneurship education compulsory in Nigerian universities since 2006 and note that graduate unemployment has not significantly reduced yet. They present business incubation as an effective tool to fill the entrepreneurial capabilities gaps that remain after entrepreneurship education.

v. Cluster 5 comprising publications by Adelowo et al (2015), Adelowo (2020) and Adegbite (2001), bears striking structural similarities, respectively, to Cluster 4 where

all studies are situated in the Nigerian context and Cluster 2 where one author is associated with the majority of the studies. Obviously, Adegbite (2011) is cited in both Adelowo et al (2015) and Adelowo (2020). The latter study of Adelowo also cites the former. Adegbite (2001) reviews the evolution of business incubators in Nigeria and provides specific recommendations on how to make the incubators more impactful, including *inter alia* integration into the enterprise support ecosystem. The two studies of Adelowo build upon this recommendation by examining a specific component of the enterprise support ecosystem to which incubators contribute, that is, technological learning. They highlight weak linkages with knowledge institutions and inadequate technical training facilities within the incubators as some of the major obstacles to technological learning by firms in incubators. To surmount these obstacles, they recommend adequate training, proper linkages with research institutions and improved internal technological efforts

It is striking to note a key attribute of the citation network: sparse connection among the papers, suggesting that African researchers who study business incubators do not "talk much to one another." Evidence of this exists even in the largest connected component. Although each of the clusters has strong internal homogeneity in terms of country and topical focus, it is surprising that these clusters exist in the first place given the similarities in geographical and topical focus across clusters. For instance, clusters 1 and 2 focus almost exclusively on South Africa and MSMEs while clusters 4 and 5 are all set in Nigeria. One implication of this is that researchers need to be more systematic in their reviews of the literature.

3.3. Major themes in business incubator research in Africa

A bibliographic coupling network maps articles based on their common references. It shows specifically how the connected articles may be related on the basis of having one or more common references (Ma et al, 2022). Each cluster in the network provides a picture of the topical or disciplinary areas around which the network nodes are organised. Figure 4 shows the largest connected component in the bibliographic coupling network of incubators research in Africa

between 1993 and 2020. It contains 27 out of the total 48 publications included in this study. The remaining 21 publications are excluded for being in isolation.

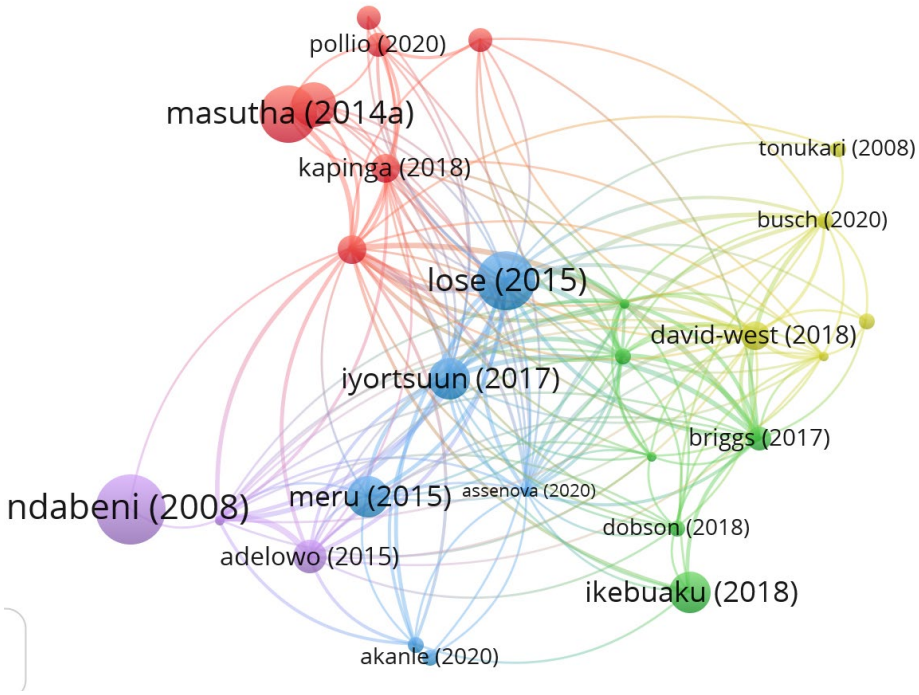

Figure 4: Bibliographic coupling network of research on incubators in Africa, 1993-2020
Note: Each bubble represents one paper, each line represents a coupling link and bubble size is weighted by citations

There are five clusters which correspond to five broad themes in the research on incubators in Africa, summarised in Table 5. In the first theme which has seven studies, the focus is on how different types of incubators offer support in diverse ways to different groups including MSMEs, digital entrepreneurs, women entrepreneurs and artisanal businesses. The second theme is about how well business incubators facilitate innovation and the accumulation of capabilities by firms. The third theme includes studies that examine the impact of incubators at the micro and macro levels, respectively in terms of firm performance and youth employment. In the fourth theme, emphasis is on the link between business incubators and the evolution of the start-up economy in different African countries. Incubators as learning platforms make the fifth theme.

While these themes are diverse and comprehensive in their own rights, some major gaps are obvious. First, topical issues such as climate change and industrialisation are conspicuously missing in the body of research. Without doubt, business incubators have a role to play in seeding enterprises that address these challenges. The absence of studies on them may indicate that they are out of scope for the conventional business incubators or that the incubators are ill-suited for such enterprises. Second, there is a dearth of rigorous impact evaluations of business incubators in Africa. Reliably assessing incubator impact requires rigorous quantitative analyses because qualitative assessments may be prone to social desirability bias when incubator managers, employees, tenants and other stakeholders are interviewed. Third, there are hardly any studies that closely examine the limits and potential opportunities for improving the specific forms of support that incubators offer across sectors and countries in Africa.

Table 5: Themes in incubators research in Africa

S/N	Theme	Size	Studies
1	Incubator types and support for different business types	7	Pollio (2020), Frederici (2019), Kapinga et al (2018), Teselepis (2018) and Masutha and Rogerson (2014a,b, 2015)
2	Incubator performance in fostering innovation and capability building	6	Mvulirwenande (2020a,b), Dobson et al (2018), Ikebuaku and Dinbabo (2018), Kinya et al (2018) and Briggs (2017)
3	Impact of incubators on businesses and the economy	6	Assenova (2020), Akanle and Omotayo (2019), Iyortsuun (2017), Lose and Tengeh (2015), Meru and Struwig (2015) and Akhuemonkhan et al (2014)
4	Role of incubators in supporting emergence and growth of start-ups	5	Busch (2020), Tibaingana (2019), David-West (2018), Muriithi et al (2018) and Tonukari (2008)
5	Incubators as enablers of firm-level learning	3	Adelowo (2020), Adelowo et al (2015) and Ndabeni (2008)

3.4. Scholarly influencers of business incubator research in Africa

The co-citation network, a mapping of all studies that were mutually cited by two separate studies on incubation in Africa, is shown in Figure 5. It gives us a hint on the key scholarly contributions that have influenced the shape and direction of incubators research in Africa. The network includes 1296 cited authors associated with 701 publications in total. The modal publication and author were cited only once. Only 229 (around 18%) of the authors associated

with 65 (about 9%) of the publications have been cited at least twice. One of these 229 authors is not connected to any of the others.

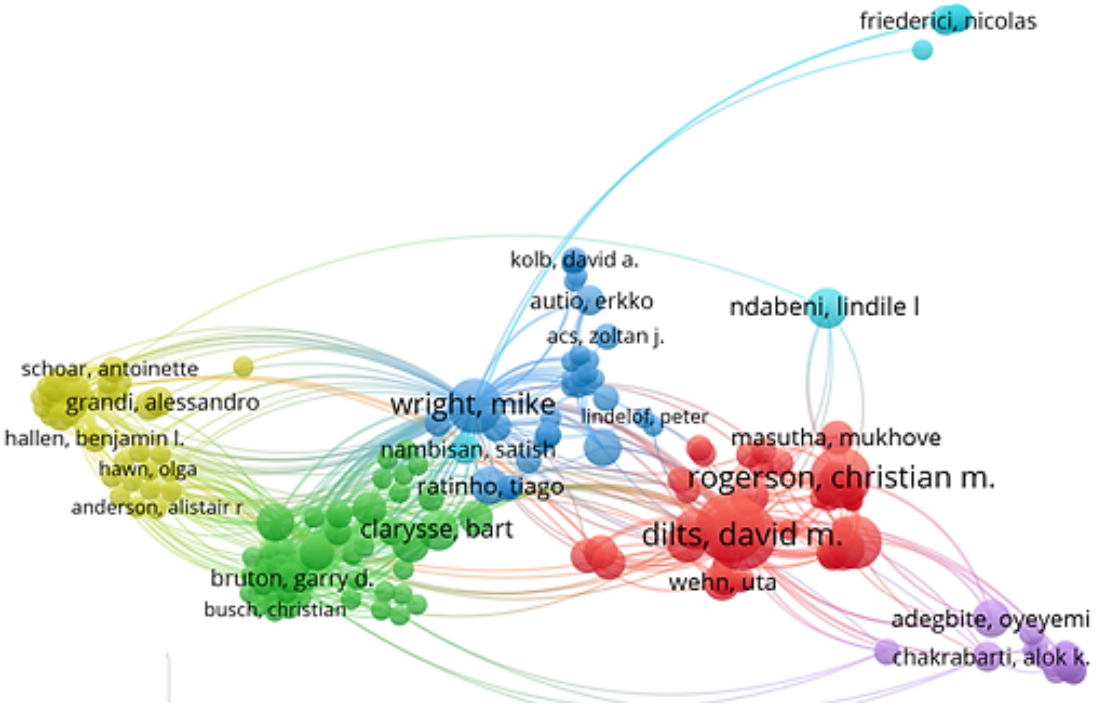

Figure 5: Co-citation network of research on business incubators in Africa, 1993-2020
Note: Each bubble represents one paper, each line represents a co-citation link and bubble size is weighted by citations

In all, the 701 documents were cited 826 times at an average of 1.2 citations per document. Table 6 lists the most cited references. Three things come out from this list. First, African incubators research seems to rely heavily on foreign scholarship. In particular, 70% of the most cited references have been authored by non-Africans and only one journal in the list (Development Southern Africa) is published in Africa. This goes to further show the need for more high-quality research on incubators in Africa. Second, a few authors have exerted a huge influence on the research on business incubators in Africa. Nearly 40% of all citations in Table 6 are accounted for by four authors: S. M. Hackett, D. M. Dilts, A. Bergek and C. Norman. The most cited paper by far (13 citations) is a 2004 paper in the Journal of Technology Transfer by Hacket and Dilts. These authors published another paper in the same issue of the same journal which was cited 6

times in total. That particular issue of the Journal of Technology Transfer has been particularly influential, accounting for over a third of all citations reported in Table 5. Finally, the top cited papers appear predominantly in a few journals—mainly the Journal of Technology Transfer (3 publications) and Technovation (2 publications) —published outside Africa.

Table 6: Top cited references by the research on African incubators (greater than 5 citations)

Cited reference	Citations	Google Scholar Citations
Hackett, S. M., & Dilts, D. M. (2004). A systematic review of business incubation research. The Journal of Technology Transfer, 29(1), 55-82.	13	1603
Ndabeni, L. L. (2008). The contribution of business incubators and technology stations to small enterprise development in South Africa. Development Southern Africa, 25(3), 259-268.	7	101
Bergek, A., & Norrman, C. (2008). Incubator best practice: A framework. Technovation, 28(1-2), 20-28.	7	1480
Hackett, S. M., & Dilts, D. M. (2004). A real options-driven theory of business incubation. The Journal of Technology Transfer, 29(1), 41-54.	6	497
Rice, M. P. (2002). Co-production of business assistance in business incubators: an exploratory study. Journal of Business Venturing, 17(2), 163-187.	6	758
Adegbite, O. (2001). Business incubators and small enterprise development: the Nigerian experience. Small Business Economics, 17(3), 157-166.	6	240
Lalkaka, R. (2002). Technology business incubators to help build an innovation-based economy. Journal of Change Management, 3(2), 167-176.	6	328
Masutha, M., & Rogerson, C. M. (2014). Small enterprise development in South Africa: The role of business incubators. Bulletin of Geography. Socio-economic Series, (26), 141-155.	5	77
Peters, L., Rice, M., & Sundararajan, M. (2004). The role of incubators in the entrepreneurial process. The Journal of Technology Transfer, 29(1), 83-91.	5	782
Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. Technovation, 32(2), 110-121.	5	965

A look at the clusters in the co-citation network provides a hint on the different research streams that incubators research in Africa draws upon. The network has six clusters as follows:

i. Cluster 1 features scholars mainly from the ***innovation economics and open innovation*** literatures, including Massimo Colombo, Henry Chesbrough, Anna Bergek and David Allen, among several 45 others.

ii. Cluster 2 mainly includes the works of scholars like Gary Bruton, Martin Kilduff, Michael Schwartz and Johan Wiklund mainly from the ***strategic management and organisational behaviour*** literatures.

iii. Cluster 3 has a strong presence of contributions from the ***entrepreneurship and development*** literature, including the works of scholars like Zoltan Acs, Erkko Autio, Alain Fayolle, Wim Naudé, Mike Wright and Friederike Welter.

iv. Cluster 4 features scholars like Alistair Anderson, Nicholas Bloom, Rosa Grimaldi, David McKenzie, Scott Shane, Dean Shepherd, Mark Schaffer, Antoinette Schoar and Benson Honig mainly from the ***development economics and entrepreneurship/innovation management*** literatures.

v. Cluster 5 is a bit more eclectic than the preceding four clusters. It includes contributions from the ***science and technology studies, technology management, innovation theory and catch-up*** literatures. The cluster features the works of scholars like Elias Carayannis, Martin Bell, Sanjaya Lall, Daniel Levinthal, Wesley Cohen, Franco Malerba, Mark Dogson, Scott Stern and Richard Nelson, Oyeyemi Adegbite and Willie Siyanbola.

vi. Cluster 6 is also eclectic, including scholars like Moses Kiggundu from ***international business and management***, and Nicolas Friederici whose work focuses on ***modern forms of entrepreneurship***.

4. Discussion and Conclusion

Business incubators have proliferated in LICs starting from the 1990s and they are believed to support MSME performance (Leblebici and Shah, 2004; Scaramuzzi, 2002). These incubators have been the subject of a growing but fragmented body of research. Using a systematic review, this paper attempted to organise this body of research and identify main intellectual traditions and trajectories. The descriptive analyses show that research on incubators in Africa has only recently emerged but has been on the rise since the first paper appeared in 1993. I must admit, however, that the coverage of this study may be limited given that I had used only one database. Notwithstanding, the database used has the advantages of being more comprehensive and significantly overlapping with the more conventional databases like Scopus which have been heavily critiqued for under-reporting research from Africa. We leave it to further studies to compare my findings with what a similar search in the more conventional databases will yield.

The detailed bibliometric analyses raise some important results that highlight opportunities for future research. First, limited evidence exists on how to improve incubator support to businesses across sectors and countries. Typically, most incubators offer training in entrepreneurship and business management, in addition to the conventional support services (Ganamoste et al, 2017; Akçomak, 2011; Adegbite, 2001). However, it has been reported recently that psychology-based training on entrepreneurial behaviours works better in enhancing firm performance in West Africa (Frese et al, 2016; Campos et al, 2017). Based on this, a case can be made for modifying existing incubator support services to include this kind of training. Studies providing evidence on this aspect will make policy-relevant contributions to the literature.

Second, some of the reviewed studies highlight the need for incubators to be adaptive given that the needs of businesses tend to vary across sectors, countries and growth stages. However, no evidence exists on how to design and implement adaptive, responsive and inclusive incubation systems. In order to achieve this, it is critically important to understand what works when. Studies that provide this sort of evidence will help to inform policies aimed at private sector development in Africa. For instance, the existing research provides very little insight about how well business incubators can support firms that work in new and rapidly emerging sectors like biotechnology, digital technologies and green technologies. Do conventional business incubators work for these sectors or do we need altogether new incubation models? How should these models be designed? An emerging stream of literature has typified a new incubation model, the so-called ***Do-It-Yourselves (DIY) tech hubs***. These hubs typically offer a co-working space where technologists, computer scientists, programmers and web developers come together to network and share knowledge and skills to actualise their ideas (Kolade et al, 2020). According to Atiase et al (2020), such hubs are well suited to the knowledge economy and they are more effective in generating employment and expanding access to better quality public services although they require institutional support to thrive. Studies on how to support the emergence and growth of these DIY tech hubs are needed.

Finally, the analyses also show that rigorous impact evaluations are conspicuously missing from the reviewed body of research. Indeed, quantitative impact evaluations of incubators are scarce (Akçomak, 2011) and restricted to developed countries (e.g., Stokan et al, 2015; Schwartz, 2013;

Colombo and Delmastro, 2002). With the exception of the one study by Assenova (2020), impact assessment studies in Africa are merely descriptive and offer limited insight on the causal impact of business incubators (Ganamoste et al, 2017; Siyanbola et al, 2012; Adelowo et al, 2012; Adegbite, 2001). This underscores the need to build up evidence on the impact of business incubators in LICs, to inform enterprise policy. Quantitative impact evaluations of incubators are hard to implement for two methodological reasons: one, it is difficult to define a universally acceptable set of performance criteria to assess because incubators vary in goals and expected outcomes (Akçomak, 2011) and two, constructing a valid control group is challenging (Sherman and Chappell, 1988). These problems are deepened in LICs by a third one: the lack of appropriate data. These three concerns need to be addressed in future research.

To conclude, it is worth mentioning the clear and coherent agreement in the literature on the utility of business incubators. They represent a veritable tool for supporting the survival and growth of viable enterprises in Africa across different sectors. Scholars, practitioners and policymakers together will agree that Africa needs business incubators in its pursuit to reduce the burden of unemployment and foster industrial development.

Acknowledgements

This paper is an output of the exploratory project *Evaluating and Enhancing the impact of business incubators in developing countries: evidence from Nigeria* [ERG #7487] funded by the Private Enterprise Development in Low-Income Countries (PEDL) programme, a joint initiative of the Centre for Economic Policy Research (CEPR) and the Foreign and Commonwealth Development Office (FCDO). I thank participants at the 5th Africalics Conference in Yaounde, Cameroon (November 9-11, 2022) and the 1st Nigerialics Conference in Lagos, Nigeria (February 9-10, 2023) for useful comments.

References

Adegbite, O. (2001). Business Incubators and Small Enterprise Development: The Nigerian Experience. Small Business Economics, 17 (3): 157–66.

Adelowo, C. M., Olaopa, R. O. and Siyanbola, W. O. (2012). Technology Business Incubation as Strategy for SME Development: How Far, How Well in Nigeria? Science and Technology 2(6):172-181

Aernoudt, R. (2004). Incubators: tool for entrepreneurship? Small Business Economics 23, 127–135.

Akçomak, S. (2011). Incubators as tools for entrepreneurship promotion in developing countries. Chapter 10 in Szirmai, A., Naudé, W. and Goedhuys, M. (eds.) Entrepreneurship, innovation and economic development. Oxford: Oxford University Press.

Allen, D., McCluskey, R. (1990). Structure, policy, services, and performance in the business incubator industry. Entrepreneurship: Theory and Practice 15 (2), 61–77.

Assenova, V. A. (2020). Early-stage venture incubation and mentoring promote learning, scaling, and profitability among disadvantaged entrepreneurs. Organization Science, 31(6), 1560-1578.

Atiase, V. Y., Kolade, O., & Liedong, T. A. (2020). The emergence and strategy of tech hubs in Africa: Implications for knowledge production and value creation. Technological Forecasting and Social Change, 161, 120307.

Bamberger, M. (2014). Reconstructing Baseline Data for Impact Evaluation and Results Measurement. Mimeo. World Bank PremNotes

Bergek, A. and Norrman, C. (2008). Incubator best practice: a framework. Technovation 28: 20-28

Campos, F., Frese, M., Goldstein, M., Iacovone, L., Johnson, H. C., McKenzie, D., & Mensmann, M. (2017). Teaching personal initiative beats traditional training in boosting small business in West Africa. Science, 357(6357), 1287-1290.

Chandra, A., & Chao, C.A. (2015). Country context and university affiliation: A comparative study of business incubation in United States and Brazil. Journal of Technology Management and Innovation, 11(2), 33–45.

Colombo, M. G., and M. Delmastro (2002). How Effective Are Technology Business Incubators: Evidence from Italy. Research Policy, 31: 1103–22.

Davis P, Lewenstein B, Simon D, Booth J & Connolly M (2008). Open access publishing, article downloads, and citations: randomised controlled trial. British Medical Journal 337: a568

Duermeijer, C., Amir, M. and Schoombee, L. (2018). Africa generates less than 1% of the world's research; data analytics can change that. Elsevier Connect. March, 22, 2018.

Egbetokun, A., Olofinyehun, A., Ayo-Lawal, A., Oluwatope, O., Sanni, M., and Yusuff, U. (2020). Doing Research in Nigeria Country Report: Assessing Social Science Research System in a Global Perspective. GDN-NACETEM. Available at http://www.gdn.int/sites/default/files/u115/Doing%20Research_Nigeria_Country%20Report.pdf

Egbetokun, A., Olofinyehun, A., Sanni, M., Ayo-Lawal, A., Oluwatope, O. and Utieyineshola, Y. (2022). The production of social science research in Nigeria: status and systemic determinants. Humanit Soc Sci Commun 9:1. https://doi.org/10.1057/s41599-021-01017-z

European Commission (2002). Benchmarking of Business Incubators. Kent: Center for Strategy and Evaluation Services.

Eysenbach G (2006). Citation Advantage of Open Access Articles. PLoS Biology 4(5):e157

Frese, M., Gielnik, M. M., & Mensmann, M. (2016). Psychological Training for Entrepreneurs to Take Action: Contributing to Poverty Reduction in Developing Countries. Current Directions in Psychological Science, 25(3), 196–202.

Ganamotse, G. N., Samuelsson, M., Abankwah, R. M., Anthony, T., & Mphela, T. (2017). The emerging properties of business accelerators: The case of Botswana, Namibia and Uganda global business labs. Journal of Entrepreneurship and Innovation in Emerging Economies, 3(1), 16-40.

Gaule, P. and Maystre, N. (2011). Getting cited: Does open access help? Research Policy, 40(10), 1332-1338.

Hackett, S. and Dilts, D. (2004). A systematic review of incubator research. Journal of Technology Transfer, 29:55-82

Herzog, C., Hook, D. and Konkiel, S. (2020). Dimensions: Bringing down barriers between scientometricians and data. Quantitative Science Studies, 1(1): 387–395.

Kolade, O., Atiase, V., Murithi, W., & Mwila, N. (2021). The business models of tech hubs in Africa: implications for viability and sustainability. Technology Analysis & Strategic Management, 33(10), 1213-1225.

La Porta, R. and Shleifer, R. (2014) "Informality and Development". Journal of Economic Perspectives 28(3): 109-126.

Lalkaka, R. (2002). Technology Business Incubators to Help Build an Innovation-Based Economy. Journal of Change Management 3 (2): 167–176.

Leblebici, H., and N. Shah (2004). The Birth, Transformation and Regeneration of Business Incubators as New Organisational Forms: Understanding the Interplay between Organisational History and Organisational Theory. Business History, 46 (3): 353–80.

Ma, T. J., Lee, G. G., Liu, J. S., Lan, R., & Weng, J. H. (2022). Bibliographic coupling: a main path analysis from 1963 to 2020. Information Research 27(1). DOI: https://doi.org/10.47989/irpaper918

Markley, D. and McNamara, T. (1995). Economic and fiscal impacts of a business incubator. Economic Development Quarterly, 9(3): 273-278.

Mas-Verdu, F., Ribeiro-Soriano, D., & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. Journal of Business Research, 68(4), 793–796.

Page, J. and Söderbom, M. (2015), Is Small Beautiful? Small Enterprise, Aid and Employment in Africa. African Development Review, 27: 44-55.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D.,… & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Sayre, April Pulley (1999), Africa, Twenty-First Century Books. ISBN 0-7613-1367-2.

Sherman, H. and Chappell, D. S. (1988). Methodological challenges in evaluating business incubator outcomes. Economic Development Quarterly, 12(4): 313-321

Siyanbola, W. O., Jesuleye, O. A., Adelowo, C. M., and Egbetokun, A. A. (2012). Coordination, Monitoring, and Impact Evaluation of Technology Incubators in Nigeria. In N. Ekekwe, & N. Islam (Eds.), Disruptive Technologies, Innovation and Global Redesign: Emerging Implications. Hershey: IGI Global.

UN-DESA (2019a). World Population prospects – Population division"". population.un.org. United Nations Department of Economic and Social Affairs, Population Division. Retrieved 9 November 2019.

UN-DESA (2019b). Overall total population" – World Population Prospects: The 2019 Revision" (xslx). population.un.org (custom data acquired via website). United Nations Department of Economic and Social Affairs, Population Division. Retrieved 9 November 2019.

van Eck, N. J. and Waltman, L. (2020). VOSviewer Manual.

Visser, M., van Eck, N. J. and Waltman, L. (2021). Large-scale comparison of bibliographic data sources: Scopus, Web of Science, Dimensions, Crossref, and Microsoft Academic. Quantitative Science Studies, 2(1): 20–41

Appendix

Table 7: Full list of papers reviewed at full text in descending order of publication year

S/N	Authors	Title	Source title	Year	Volume	Issue	Pages
1	Pollio, Andrea	Incubators at the Frontiers of Capital: An Ethnographic Encounter with Startup Weekend in Khayelitsha, Cape Town	Annals of the American Association of Geographers	2020	110	4	1-16
2	Akanle, Olayinka; Omotayo, Abraham	Youth, unemployment and incubation hubs in Southwest Nigeria	African Journal of Science Technology Innovation and Development	2020	12	2	1-8
3	Busch, Christian; Barkema, Harry	Planned Luck: How Incubators Can Facilitate Serendipity for Nascent Entrepreneurs Through Fostering Network Embeddedness	Entrepreneurship Theory and Practice	2020			
4	Mvulirwenande, Silas; Wehn, Uta	Fostering water innovation in Africa through virtual incubation: Insights from the Dutch VIA Water programme	Environmental Science & Policy	2020	114		119-127
5	Adelowo, Caleb Muyiwa	Sources of technological learning among tenants of Nigeria's incubators	African Journal of Science Technology Innovation and Development	2020	12	5	1-17
6	Mvulirwenande, Silas; Wehn, Uta	Opening the innovation incubation black box: A process perspective	Environmental Science & Policy	2020	114		140-151
7	Obaji, Nkem O.; Olaolu, Dele	Evaluation Study on the Barriers to Success of Technology Business Incubation Programme in Nigeria – The Moderating Role of Government Policy	Journal of Economics and Business	2020	3	1	
8	Assenova, Valentina A.	Early-Stage Venture Incubation and Mentoring Promote Learning, Scaling, and Profitability Among Disadvantaged Entrepreneurs	Organization Science	2020			
9	Aksoy, Lerzan; Allerstorfer, Peter; Cadet, Fabienne; Cook, Paul; Keiningham, Timothy; Koser, Manuel	Building service businesses in Africa: Introducing the business builder model	Thunderbird International Business Review	2020	62	1	5-16
10	Friederici, Nicolas	Innovation Hubs in Africa: What Do They Really Do for Digital Entrepreneurs?	Palgrave Studies of Entrepreneurship in Africa	2019			9-28
11	Tibaingana, Anthony	Application of the elements of marketing mix by business start-ups during incubation: A case of Makerere University in Uganda	African Journal of Business Management	2019	13	2	48-57
12	Usman, Baba Isah; Mustapha, Zubairu Umaru; Dokochi,	Investigating the Impact of Entrepreneurial Infrastructure	IJEBD (International Journal of Entrepreneurship and Business	2019	3	1	13-24

	Mohammed; Umar, Jaafar; Maitala, Faiza	Deficit on Firm Growth	Development)				
13	Tibaingana, Anthony	Anecdotal Evidence of the Role of Incubation in the Growth of Business Start-Ups in Uganda	International Business Research	2019	13	1	64
14	Gonsalves, Maruschka; Rogerson, Jayne M.	Business incubators and green technology: The Gauteng Climate Innovation Centre, South Africa	Urbani Izziv	2019	Suppl.	30	212-228
15	Ikebuaku, Kenechukwu; Dinbabo, Mulugeta	Beyond entrepreneurship education: business incubation and entrepreneurial capabilities	Journal of Entrepreneurship in Emerging Economies	2018	10	1	154-174
16	Kapinga, Alsen Florian; Suero Montero, Calkin; Mwandosya, Godfrey Issac; Mbise, Esther Rosinner	Exploring the contribution of business and technology incubators to women entrepreneurs' business development in Dar es Salaam, Tanzania	Journal of Global Entrepreneurship Research	2018	8	1	23
17	David-West, Olayinka; Umukoro, Immanuel Ovemeso; Onuoha, Raymond Okwudiri	Platforms in Sub-Saharan Africa: startup models and the role of business incubation	Journal of Intellectual Capital	2018	19	3	581-616
18	Tselepis, Thea Judith	When clothing designers become business people: a design centred training methodology for empowerment incubation	International Journal of Fashion Design Technology and Education	2018	11	3	1-11
19	Muriithi, Jane Gathiga; Wanjau, Kenneth; Omondi, Humphrey	Performance of Incubator Centres in Kenya	International Journal of Research In Business and Social Science	2018	7	1	49-59
20	Kinya, Miriti Jane; Wanjau, Kenneth L; Omondi, Humphrey R	Client Selection Criteria and Performance of Incubator Centers in Kenya	International Journal of Research In Business and Social Science	2018	7	1	25-34
21	Iyortsuun, Akuraun Shadrach	An empirical analysis of the effect of business incubation process on firm performance in Nigeria	Journal of Small Business & Entrepreneurship	2017	29	6	1-27
22	Briggs, Kristina Henricson	Business Incubation in Dar es Salaam	Africa Journal of Management	2017	3	2	1-21
23	Wachira, Kevin; Ngugi, Patrick; Otieno, Romanus Odhiambo	Role of Social Networks in University Based Business Incubators in Promoting Entrepreneurship Growth in Kenya	International Journal of Academic Research in Economics and Management Sciences	2017	6	1	
24	Wachira, Kevin; Ngugi, Patrick; Otieno, Romanus Odhiambo	Incubatee Selection Criteria and its Role on Entrepreneurship Growth: A Survey of University Based Business Incubators in Kenya	International Journal of Academic Research in Business and Social Sciences	2017	7	1	
25	Abaho E; Nkambwe I	Business Incubation in Uganda, Services, Processes and Incubatee Perceptions- A case study	Makerere Business Journal	2017	13	1	94-108
26	Lose, Thobekani; Tengeh,	The Sustainability and	Sustainability	2015	7	10	14344-

	Robertson K.	Challenges of Business Incubators in the Western Cape Province, South Africa					14357
27	Meru, Abel Kinoti; Struwig, Miemie	Business-Incubation Process and Business Development in Kenya: Challenges and Recommendations	Journal of Entrepreneurship and Innovation in Emerging Economies	2015	1	1	1-17
28	Adelowo, Caleb Muyiwa; Ilori, Matthew Olugbenga; Siyanbola, Willie Owolabi; Oluwale, Billy A	Technological learning mechanisms in Nigeria's technology incubation centre	African Journal of Economic and Management Studies	2015	6	Issue 1	72-89
29	Masutha, Mukovhe; Rogerson, Christian M.	Business Incubation for Small Enterprise Development: South African Pathways	Urban Forum	2015	26	2	223-241
30	Bijaoui, Ilan	Open incubators and clusters in South Sudan: A move to achieve economic peace	African Journal of Business Management	2015	9	20	718-726
31	Bigirimana, Stanislas; Jagero, Nelson; Mutiwanyuka, Chemwi	Challenges Faced by the Mary Mount Catholic Parish in Establishing a Business Incubation Centre in Rushinga, Mashonaland Province, Zimbabwe	International Journal of Academic Research in Business and Social Sciences	2015	5	2	
32	Masutha, Mukhove; Rogerson, Christian M.	Small enterprise development in South Africa: The role of business incubators	Bulletin of Geography Socio-economic series	2014	26	26	141-155
33	Masutha, Mukovhe; Rogerson, Christian M	Small business incubators: An emerging phenomenon in South Africa's SMME economy	Urbani Izziv	2014	25	Suppl.	s47-s62
34	Akhuemonkhan, Innocent; Raimi, Lukman; Patel, Ashok M; Fadipe, Adeniyi O.	Harnessing the potentials of technology incubation centres (TICs) as tools for fast-tracking entrepreneurship development and actualisation of the Vision 20:2020 in Nigeria	Humanomics	2014	30	4	349-372
35	Fiates, Gabriela Gonçalves Silveira; Martins, Cristina; Fiates, José Eduardo Azevedo; Martignago, Graciella; Santos, Neri dos	Análise do papel da incubadora na internacionalização de empresas de base tecnológica, incubadas e graduadas	Revista Eletrônica de Estratégia & Negócios	2013	6	1	252-274
36	Ozor, Nicholas	The Role of Agribusiness Innovation Incubation for Africa's Development	African Journal of Science Technology Innovation and Development	2013	5	3	242-249
37	Pooe, R; Mafini, C	Business development challenges in a rural District Municipality in South Africa: A case of Fezile Dabi District Municipality	The Southern African Journal of Entrepreneurship and Small Business Management	2012	5	1	89
38	Bubou, Gordon Monday; Okrigwe, Festa Ndutimi	Fostering Technological Entrepreneurship for Socioeconomic Development: A Case for Technology Incubation in Bayelsa State,	Journal of Sustainable Development	2011	4	6	

		Nigeria					
39	Meru, Abel Kinoti; Struwig, Miemie	An Evaluation of the Entrepreneurs' Perception of Business-Incubation Services in Kenya	International Journal of Business Administration	2011	2	4	
40	Raiz, Allon	Business incubation in the private sector, South Africa	Enterprise Development and Microfinance	2009	20	1	61-70
41	Ndabeni, Lindile L	The contribution of business incubators and technology stations to small enterprise development in South Africa	Development Southern Africa	2008	25	3	259-268
42	Tonukari, Nyerhovwo J.	Africa Needs Biotechnology Incubators	Biotechnology(Faisalabad)	2008	7	4	803-807
43	Adegbite, Oyeyemi	Business Incubators and Small Enterprise Development: The Nigerian Experience	Small Business Economics	2001	17	3	157-166
44	Hyman, Eric L.; Strauss, Robert; Crayne, Richard	An enterprise-development strategy for Zambia	Development in Practice	1993	3	2	103-115
45	Kamel, Sherif H.	The Role of an Innovative ICT-Based Entrepreneurial Evolution on Africa's Development: The Case of University-Based Incubators		2017			31-67
46	Dobson, Stephen; Maas, Gideon; Jones, Paul; Lockyer, Joan	Experiential Learning Through the Transformational Incubation Programme: A Case Study from Accra, Ghana		2018			225-244
47	Dusingize, Marie Paul; Nyiransabimana, Venantie	A Study of University Social Responsibility (USR) Practices at Rwanda's Institut Catholique de Kabgayi		2017			143-166
48	Barrows, David; Kist, Holger	The resilience of economic clusters: The role of innovation incubators		2013			121-133

Table 8: ANZRC* fields of research and corresponding journals

0502: Environmental Science and Management (2 journals)
Environmental Science & Policy
Journal of Sustainable Development
0806: Information System (1 journal)
Journal of Global Entrepreneurship Research
1099: Other Technology (1 journal)
International Journal of Fashion Design Technology and Education
1205: Urban and Regional Planning (3 journals)
International Journal of Fashion Design Technology and Education
Sustainability
Urban Forum
1302: Curriculum and Pedagogy (1 journal)
International Journal of Fashion Design Technology and Education
1402: Applied Economics (8 journals)
African Journal of Science Technology Innovation and Development
Bulletin of Geography Socio-economic series
Development Southern Africa
Enterprise Development and Microfinance
International Journal of Entrepreneurship and Business Development
Journal of Economics and Business
Journal of Entrepreneurship and Innovation in Emerging Economies
Journal of Entrepreneurship in Emerging Economies
1499: Other Economics (2 journals)
Enterprise Development and Microfinance
International Journal of Academic Research in Economics and Management Sciences
1501: Accounting, Auditing and Accountability (1 journal)
Journal of Intellectual Capital
1503: Business and Management (23 journals)
Africa Journal of Management
African Journal of Business Management
African Journal of Economic and Management Studies
African Journal of Science Technology Innovation and Development
Biotechnology (Faisalabad)
Bulletin of Geography Socio-economic series
Entrepreneurship Theory and Practice
Humanomics
International Journal of Entrepreneurship and Business Development
International Business Research
International Journal of Academic Research in Business and Social Sciences
International Journal of Business Administration
International Journal of Research in Business and Social Science
Journal of Entrepreneurship in Emerging Economies
Journal of Global Entrepreneurship Research
Journal of Small Business and Entrepreneurship

Journal of Sustainable Development
Makerere Business Journal
Organization Science
Revista Eletrônica de Estratégia and Negócios
Small Business Economics
Southern African Journal of Entrepreneurship and Small Business Management
Thunderbird International Business Review
1505: Marketing (2 journals)
Entrepreneurship Theory and Practice
International Journal of Business Administration
1604: Human Geography (1 journal)
Journal of Sustainable Development
1605: Policy and Administration (4 journals)
Annals of the American Association of Geographers
Bulletin of Geography Socio-economic series
Development in Practice
Environmental Science & Policy
1606: Political Science (1 journal)
Urbani Izziv

***** ANZSRC stands for Australian and New Zealand Standard Research Classification, the default in the Dimensions database.