Financial Inclusion and Cluster-Based Industrialization

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Abstract: *There are two related lines of arguments which forms twin objectives for this study. The first is to assess how financial inclusion may spur industrilization in Africa, and the second is to assess how industrialization may prosper where there is clustering of SMEs/industrial activities in Africa. The study employs a quantitative approach where regression analysis is used employing secondary data from the World Bank Development Indicators for Seven African economies. The study found that clustering promotes industrial growth. It has also found lack of evidence for the role of financial inclusion in promoting industrial growth. It also did not find statistical evidence for joint effects of these factors on industrialization. It calls for policy dressing and specific researches in the areas of clustering properties and financial inclusion and their effects on industrial growth.*

Key words: financial inclusion, clustering, industrialization, industrial growth

Introduction
Developing countries, particularly in Africa have looked at small industries with hopeful stances, waiting to see how they could contribute to industrialization process. Evidences have been established that point to the crucial roles that clustering played in promoting industrial growth in China (e.g. Long & Zhang, 2011; Zhou *et al*., 2019; Zhu *et al*., 2019) and in Africa as well (e.g. McCormick, 1999). Some of the notable contribution of clustering to industrial growth are the breeding of collective efficiency, encouraging growth in small steps and swiftness in responding to opportunities and crises, promoting start-ups, labor/skills pooling and boosting export performance. (McCormick, 1999; Long & Zhang, 2011). Clustering is expected to easy and or solve some of the challenges that face Africa in the industrialization process (McCormick, 1999).

The African industrial cluster experiences can be summarized based on the work of McCormick (1999). He studied six cases from Ghana, Kenya, and South Africa and found that the African clusters were characterized by a combination of some of the following features; high heterogeneity, less connectivity, weak bilateral/multilateral links, weak technology spillovers, good/bad horizontal/vertical cooperation and good/bad market access.

Conversely, an important feature of the Asian industrialization experience is marked by the presence of indutrial clusters that are highly inter-related, cross-linked, densely connected and enjoying collective efficiency (Zhu *et al*., 2019). These clusters are characterized by closer interactions within same regions, high complementarities in both real and financial resources, skill sharing possibilities and an intergrated structure of dissaggregated small steps production that are performed by a large number of firms (Long & Zhang, 2011). This feature has ushered in the contributions of clusters to economic growth in a much shorter decade-period of time in Asia particularly China than the century- length of time that Europe and America took to accomplish the same. In the context of industrial clusters, based on Cluster theory, industries have been able to reap immense benefits from symbiotic relationships such as; sharing of labour, capital, technologies and other transfarable inputs which led to industrial growth. Further evidences indicate that, clustring brings about skills sharing, builds credit trust, and an efficient way for financial institutions to facilitate firms financial inclusion and reap the benefits thereof (Long & Zhang, 2011).

Clusters present a new thinking about state, nation and local economies. They reshape roles of companies/SMEs, government and institutions in competition. Clusters are structural agglomerations of linked suppliers, service providers, firms in related industries, and allied institutions. A cluster acts as an entity for competitive exploration along with a specific firm and industrial cluster (Porter, 2000). On the other hand, developing a financial system that leads to more financial inclusion is a pre-cursor to SMEs/industrial development (Long & Zhang, 2011).

One important stakeholder in the industrial cluster framework are the financial services providers. They are able to offer credits at lower rates due to familiarity and trust built within the industrial clusters to which they are connected. The question which one raises is that, how financial inclusion within this context is able to lead cluster-based SMEs/industrial growth. In Asia, particularly China, industrialization took a few decades, whereas in Europe and America it took more than two centuries. How can Africa learn from China and possible replication within its context is the focus of this research?

This work addressed the following specific objectives as stated below:
1. To assess the effects of firms clustering on industrial growth in Africa
2. To assess the effects of financial inclusion on industrial growth in Africa
3. To assess the interaction of financial inclusion and financial inclusion size on industrial growth in Africa
4. To assess the interaction of financial inclusion and firm clustering on industrial growth in Africa

The article is organized as follows; after the introduction, the second major part contains a review of literature detailing; clustered industries and cluster theory, emperical evidence for cluster-based industrial growth, and financial inclusion in cluster-based industrial growth. The third major part contains the methods section describing the data source, variable measurements and models assessed, and the fourth section include a presentation and discussion on findings and last section presents both conclusions and recommendations.

Literature Review
Clustered Industries and Cluster Theory
Michael Porter in 1990 put forward what is popularly known as the Cluster theory (Porter, 1990), which he further explains in the context of industrial clusters (Porter, 2000). It is a micro-economically based theory of national, state and local competitiveness. The theory proposes a prominent role played by clusters in the economy. The theory envisages clusters covering not only firms of the same kind. Firms in a cluster may include agglomerations of firms across firms of a similar nature that share complementarities and or compete in the same level. They may include firms on a vertical level, such as the supplier's chain or customer's line.

They include an array of industries and entities crucial to competition. The interaction that make up a cluster span from functional forms that offer skills, informational, knowledge, research, technology, resources, product, infrastructure, to institutional and forms that share, compete and complement various listed resource types (Porter, 2000). "Drawing cluster boundaries often is a matter of degree and involves a creative process informed by understanding the linkages and complementarities across industries and institutions that are most important to competition in a particular field" (Porter, 2000: 3). The importance of the cluster "spillover" effects and their significance to productivity, innovation and industrial growth are cluster-boundaries determining factors.

For the sake of disambiguation and clarity, clusters may or may not correspond directly to aggregate industries such as manufacturing firms or beverage firms, etc. in this case the connections between firms may be weak and miss the whole idea of a cluster (Porter, 2000). Clusters occurs in many varied contexts; national, local, cities and in developed as well as developing countries. Clusters are more advanced in developed countries than in less developed countries. It is worth noting that cluster boundaries rarely conform to standard industrial classifications systems that fail to capture the acts in competition and linkages across industries in a cluster (Porter, 2000; Shakya, 2009).

The appropriate characterization of a cluster can vary in diverse locations, conditional on the segments in which the member companies compete and the strategies they employ. The theory indicate that boundaries of a cluster may evolve as new firms emerge, shrink, decline or change, new linkages may emerge or shift. Clusters are not viewed through traditional lenses of grouping firms, such as company types, sectors, industries or Standard Industrial Classification (SIC) codes, because clusters are aligned with the nature of competition and the role of governments (Porter, 2000; Zeng, 2012; World Bank, 2009).

Based on cluster theory, clusters in a micro-economic sense usher in a novel intelligence for local economies that aspires for industrialization. They restructure roles of participants in the economy (Porter, 2000; Zeng, 2012). "Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate" (Potter, 2000: 1) and consequently contribute to industrial growth. Clusters reveals the microeconomics of competitions. They suggest that a whole lot of competitive advantages lie outside a company and even outside its industry but within a cluster or between several clusters. Theoretically, a cluster acts as a unit of competition along with the firm and its industry. Thus, clusters are a driving force for exports and attracting new and foreign investments, which in turn drives industrial growth. Stated otherwise, a cluster is "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster relates to the distance over which informational, transactional, incentive, and other efficiencies occur" (Porter, 2000: 2), thus the degree to which there is effectiveness and efficinecy in these afore mentioned properties have a hypothetical positive effect on industrial growth.

Zhou *et al*. (2019) note that the formation of industrial clusters requires the following conditions; location agglomeration, complete independent industrial chain, industrial networks through widening of the vertical and horizontal production value chain. Further development of industrial clusters is achieved through specialization in production, markets and development of specialized support services and professional skills essential for further refinement of the production process (Porter, 2000). Cluster development increase in linkage with rural industrialization, urbanization, development of small towns/cities and industrial park formation which in turn create market and sources of materials. A large population propels growth of clusters by harnessing cheap labor from it which is easily pooled into these industrial clusters.

Ray (2019) posits that the development of industrial clusters takes either of two routes: spontaneous or policy driven. Spontaneous route follows the natural factors selection, for instance some clusters in the Chinese experience for example in Zhejiang, Guangdong, Fujian, Shandong provinces did emerge from this route, while policy driven route is set by government actions for instance the famous Silicon Valley cluster in the USA.

Empirical Evidence for Cluster-Based Industrial Growth

Evidently, entrepreneurial activities play crucial role in promoting cluster formation, size and strength. (Zhu *et al*., 2019). In their study, they indicate that entrepreneurial activities such as number of private firms, nascent and private and small firms; contribute significantly to industrial clusters formation, size and strength. They point out other significant determinants of cluster formation as being; geography, natural advantages, and agglomeration aspects such as localization, urbanization and population density. The concept of clustering can be captured in different ways depending on the focus of the study. For instance; to capture the concept of clustering, McCormick (1999) considers physical conglomeration in locations for the industries in terms of numbers. Conversely, Long and Zhang (2011) use a clustering algorithm that captures the idea of industry proximity based on sharing of resources such as asset, labor or outputs in terms of how industries interact one and another in terms of these resources. Despite the difference, the thrust of this review is to look at how clusters play a role into industrial growth process.

Industrialization entails building an economy's capacity to transform raw materials into new products and enabling the production system to function (McCormick,1999). There are two ways to look at industrialization and industrial growth; focusing on manufacturing value addition and focusing on firm performance per se. Long and Zhang (2011) find positive relationship between clustering and firm performance. Clustering boost competition making firms more productive, contributing to industrial growth. A developed financial system is a pre-cursor to industrial development. They note that, as late as 1970 China's financial system was still underdeveloped, evidenced rapid industrialization in China seems to have defied this pre-cursor within the same past three decades stretch. Despite the missing developed financial system, China's industries were able to complement its credits requirements cheaply within industrial clusters financial services members and firms in clusters (Zhou *et al*., 2019). Credits and trade credits could be obtained due to built trust and familiarity conditions that existed within the industrial clusters. Conversely, the same industrialization effects took more than two centuries in Europe, which China had achieved within three decades (Long & Zhang, 2011).

Long and Zhang (2011) findings suggest that increased clustering marked China's industrializtion. Based on firm level data, they find that firms in more clustered regions have high export value and total factor productivity with positive implications to industrial growth. To the contrary, they indicate that this effect is abscent in state owned non-clustered firms. They established positive causal relationships between clustering, firm financing and firms performance leading to industrial growth. Even after controlling for firm characteristics, Long and Zhang (2011) find positive and significant effect of clustering on firm performance leading to industrial growth. Their findings were robust in that all clustering measures used established positive effects on both export and total factor productivity leading to industrial growth, and the effects were economically large. They also found that firms in clusters are more productive and more competitive in the international market which consequently leads to local industrial growth and expansion. Conversely, they found that clustering is active in stimulating export leading to industrial growth. And to the contrary they show that the level of financial development has little to do with firm export performance leading to industrial growth. In constrast, Ray (2019) found negative relationship between cluster and firm performance leading to industrial growth. His further qualitative inquiry equivocally account for this apparent contradiction to the proximity of production units with other processing units which leads to cost efficiency and sales at competitive prices.

The replication of China's industrialization process through clustering needs to consider at least two aspects. Labor-intensive production technologies in line with the country's population comparative advantage (Long & Zhang, 2011; Zeng, 2012). Secondly, institutional arrangements and policies in concerned countries need to foster clustering (Mohan, 2006), following a policy driven route documented by Ray (2019), where the necessary institutional arrangements are planned and implemented to create industrial clusters. Under fiscal decentralization, local governments in China are fostering clustering the same could be emulated in Africa and elsewhere. In China for instance (Zeng, 2012), various specific economic zones and industrial clusters which came after the country's reforms are credited for China's remarkable industrial development. It is expected that this will plays a crucial part in promoting regional competitiveness (Juan 2019) and industrial growth. On a corroborative axiom, Zhou *et al*. (2019) found that massive economic development is characterized by thriving small and medium businesses and the dominance of industrial clusters. Industrial clusters are dominant in early stage of massive economy development, which progresses through transformation and ultimately leads to creation of industrialized massive economies.

Several emperically verified industrial growth related advantages of clustering are eminent in
the literature (e.g. McCormick, 1999; Long & Zhang, 2011; Zhou *et al.*, 2019). They include better access to market and suppliers, labour pooling, easy flow of technology, rise of collective effiency (McCormick, 1999) and, although less discussed, helping firms alleviate financial contraints (Zhu *et al.*, 2019).

Financial Inclusion in Cluster-based Industrial Growth
A key feature of clusturing in connection to financing benefits is that a whole production process is broken down into small steps up the production ladder which are done by many small firms. This allows the disaggregation of production through clustering which disaggregate the investment cost required in industrial production among many small firms in a narrowly clustered geographic area. Which in turn allow retail financing to be possible in a credit crunched context. Conducted over time, this builds up trust in the cluster which in turn lower transaction costs of extending and receiving credits/finance thereby reluxing working capital financing burdern (Long & Zhang, 2011).

In the framework of cluster theory, oftern included are various stakeholders, one group of special consideration is financial providers. Industrial clusters and financial providers within the same context normally enjoy economic and financial benefits of location-specific externalities and synergies (Shakya, 2009). Specifically, Barkley and Henry (2001) indicate that clustering strengthens economies of localization by saving cost through financial markets familiarity with the industrial clusters. Long and Zhang (2011) found that clustering relates more to the use of trade credits among firms, this in turn reduces reliance on external financing for working capital. Dev (2006) conceives financial inclusion as delivery of banking services at an affordable cost to the economy or part of an interested section of the economy for instance industrial clusters. Though credit is a notable part of financial inclusion, it includes other services such as saving insurance, payments, and remittance facilities (Dev, 2006). Traditionally, financal inclusion aims at drawing the unbanked into the formal financial system. Financial inclusion on a policy level represent a broader consesus on the positive role it plays on economic development and poverty reduction. It represent one of the outcomes of financial sector policies in developing counries. The evolution of such policies have gone through at least three phases: state-led agricultural and industrial development via direct credits; makert-led development through liberalization and deregulation; and, institutional building that balances government and market failures (Hannig & Jansen, 2010).

A comprehensive financial development mirrors financial inclusion. The primary function of a financial system is to facilitate the allocation and deployment of economic resources both across borders and across time (Levine, 2005). Different functions of financial system includes settling payment to facilitate exchange of goods, services and assets, pooling of resources and subdividing shares, transferring of economic resources, managing risks through elaborate financial securities through private sector and government intermediaries, providing information on shares and various securities traded in the market and dealing with incentive problem (Levine, 2005). While all financial systems provide these functions, there are large differences in how well a financial system provides these functions. It has been evidenced that, financial system integration does not automatically lead to higher financial development in developing economies (Trabelsi & Cherif, 2016), as such macroeconomic figures may not readily translate to microeconomic situations such as in the context of industrial clusters. Thus studying the role of financial system from a financial inclusion vantage gives more microeconomically visible effects on industrial growth within the context of industrial clusters. It has been well document that, financial system influence industrial growth (Beck *et al*., 2006). Financial intermediaries such as banks, and other financial institutions play financial inclusion roles from the supply side. Thus, financial intermediaries and markets, play a role in the effects of financial system on economic/industrial growth (Levine, 2005) in a microeconomical level.

Allen et al (2014) indicate that African economies have lower levels of financial development and inclusion compared to the rest of world. However, Kalunda (2014) shows that the advent of mobile money forms has considerably increased the level of financial inclusion in Africa in recent decades. Particularly, Efobi *et al*. (2014) show that ICT inclination of individuals and other variables such as age and income levels have effects on access and use of financial services leading to financial inclusion. The development of financial inclusion in economic growth agenda is an imperative strategy that need to be considered. It fosters financial deepening which in turn improve economic development in terms of industrial growth. One of the major thrusts now has been on how to mainstream rural credit from institutional sources to a wider coverage in the economy through IT-enabled forms (Mohan, 2006), this thrust is expected to contribute positively to financial inclusion. Agbenyo *et al*. (2019) argue that finance has an imperative role in economic growth. Access and usage of finance is critical for growth of an economy as it provides capital necessary to finance growth in both the agricultural and production sectors. Kalunda (2014) contends that financial inclusion avails a range of financial services at affordable prices in the right place, in a convenient form and at the opportune time.

The role of financial inclusion to economic development and industrial growth is well documented (e.g. Allen *et al*., 2014; Beck *et al*., 2006; Agarwal, 2010). They found that financial inclusion impact both industrial and economic growth.

Emperical results from industrial clusters in China suggest that both financial inclusion and clustering contribute to the emergence of new firms. The two processes reinforce each others in the firms breeding process (Long & Zhang, 2011). Financial inclusion in industrial cluster context provides firms with affordable credits and enabling less costly credit flows among firms. Clustering engages more enterpreneurs into industrial production through lowering of capital barriers and easing firms' working capital constraints through possible trade credits. Clustering easy credit constraints due to good famiriality and trust conditions in industrial clusters thereby improving firm performance leading to industrial growth (Zeng, 2012).

Increasing credit related interactions among other types of interactions between industries within regions' clusters directed China's industrialization. Evidence shows that firms grow faster in clustered regions where they are able to enjoy fair credit benefits among other advantages coming from industrial clusters. With lower constrained capitals, smaller entrepreneurs can start small businesses in the industrial cluster context. Therefore, arguably, financial system development is important, but clustering is the second-best solution in credit-constrained environments (Long & Zhang, 2011).

There are mutual effects between industrial growth and financial system development. The former creates demand for financial services particularly credits while the later mobilize and allocate financial resources to the former (Shahbaz *et al*., 2017). Several issues propel financial development. For instance, it has been argued that, developing countries have poorly developed financial systems, one remedy suggested is for them to open up their economies to the rest of the world (Levine, 2005; Shahbaz *et al*., 2017). Financial reforms and development have had positive impacts in China and India in the time of their implementations. The reforms increased participation of banks. A strong financial infrastructure is possible only if an economy is open to local participants and rest of the world in terms of finance and trade (Shahbaz *et al*., 2017).

New firms are always established using funds from either banking sector or stock markets. These sources of capital are in turn influenced by other sufficiently large sources of funds, particularly international capital markets.

When a country's capital market is restricted, by for instance cross-border flows of capital, the number of new industrial establishments that are financed will be limited in a consequence. Thus, liberalization in capital accounts increases the capital pool exposed to entrepreneurs (Vlachos & Waldenström, 2002). Thus, measure geared toward increasing financial inclusion at all national level, local level and industrial cluster context will lead to more access to financing and boost industrial growth. Liberalization of financial markets at an industrial level may leads to increased financial inclusion. It kick-starts firm creation. This reduces the cost of finding financiers to entrepreneurs and firms (Vlachos & Waldenström, 2002). Clustering facilitates trade credits from upstream industry (Long & Zhang, 2011; Zeng, 2012) such that if there is more financial inclusion that means there is a possibility of mutual reinforcement of both towards industrial growth among the networked clusters. Particularly, Zeng (2012) cites Wenzhou cluster among others in China where the trust built within clusters have significantly reduced transaction costs, often times firms operate on borrowed funds from other firms in industrial clusters they belong to or on trade credits through downstream and upstream firms.

From the preceding review the current study seeks to test the following hypotheses:

H1: *Firms clustering promote industrial growth in Africa*
H2: *Financial inclusion promote industrial growth in Africa*

H3: *Interaction of financial inclusion and financial inclusion size promote industrial growth in Africa*

H4: *Interaction of financial inclusion and firm clustering promote industrial growth in Africa*

Methods
The study follows a quantitative research method. It uses ordinary least squares estimator. The regression forms use to analyze the data are listed in Models 1, 2, and 3. Models diagnostic issues such as multicollinearity and endogeneity problems posed no threats to the analysis (the results not included). The study used real annual sales growth (%) from manufacturing industries as indicator for industrial growth (I_GROWTH) within manufacturing industries sub-groups as a dependent variable. The independent variables were namely; Financial inclusion (F_INCL) measured by percentage of firms with bank loans/line of credit, this is a reasonable measure for financial inclusion because it shows how each firm beneficially use the financial system from a capital leverage point of view for the

purpose of industrial growth (e.g. Kalunda, 2014). Cluster size (C_SIZE) was measured as a total number of industries in each manufacturing sub-group.

The method also controlled for age of industries (I_AGE) and financial inclusion size (F_SIZE). Lastly, it includes interaction variables to test moderations (F_SIZE*F_INCL and C_SIZE*F_INCL). Chart to depict trends are used to show the growth of the variables over time (these were used trend data over the indicated respective years in the charts). Regression analysis is used to assess effects of coefficients. Model 1 represents the basic regression without interaction variables, while model 2 and model 3 have added the two interaction terms to capture interaction effects for financial inclusion as defined before. The regression models are:

$$I_{GROWTH} = \alpha + C_{SIZE}B_1 + F_{SIZE}B_2 + F_{INCL}B_3 + I_{AGE}B_4 + e \ldots \ldots \ldots \ldots \ldots (1)$$

$$I_{GROWTH} = \alpha + C_{SIZE}B_1 + F_{SIZE}B_2 + F_{INCL}B_3 + I_{AGE}B_4 + (F_{SIZE} * F_{INCL})B_5 + e \ldots \ldots \ldots (2)$$

$$I_{GROWTH} = \alpha + C_{SIZE}B_1 + F_{SIZE}B_2 + F_{INCL}B_3 + I_{AGE}B_4 + (C_{SIZE} * F_{INCL})B_6 + e \ldots \ldots \ldots (3)$$

The study draws data from the World Bank Development Indicators (WBI) averages for manufacturing clusters from seven countries survey, namely Egypt, Ethiopia, DRC, Nigeria, Tanzania, Kenya and South Africa. These countries were selected randomly to represent Africa as the case of developing countries that are on the process of promoting industrialization in their economies. It pooled industrial averages in manufacturing sub-groups from each country making a total of 54 observations per country-survey-variable, which make a total of 324 country-survey observations from six variables listed above.

Findings and Dicussion
In this first part, the study presents both manufacturing value added and domestic credit to private manufacturing sector for the seven countries (namely Egypt, Ethiopia, DRC, Nigeria, Tanzania, Kenya and South Africa) to compare both the level of industrial growth and financial inclusion for the private sector over years, respectively.
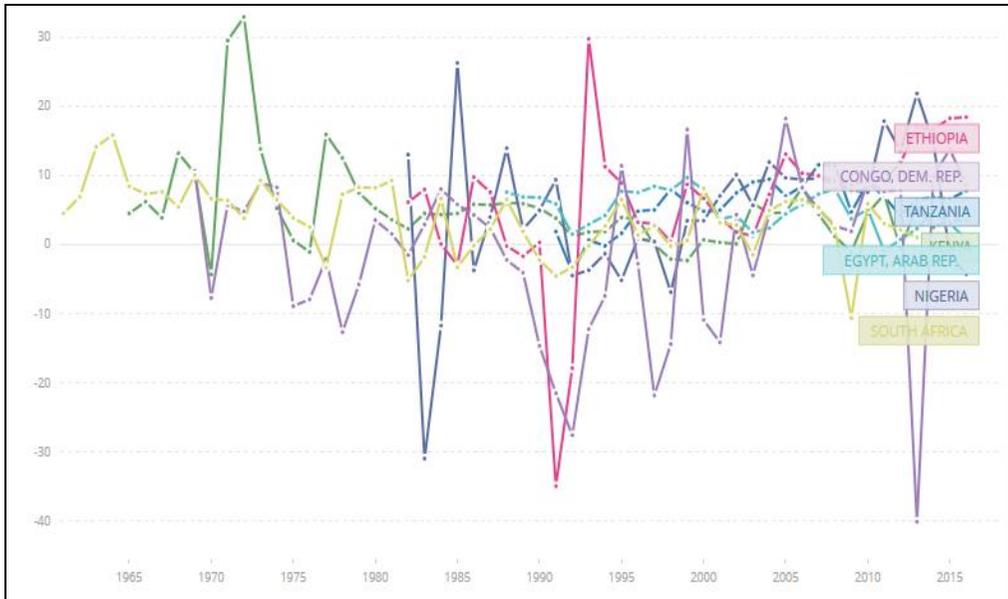
Figure 1: Manufacturing value added (Annual % Growth)

Manufacturing value added in terms of percentage of annual growth depicts (Figure 1) a cyclical trend over time for all seven economies. This indicate a prolonged (1960s to 2016) period of cyclical rising and falling of manufacturing value added. This shows instability on the growth of the manufacturing sector which is a basic indicator for industrial growth and therefore industrialization. The process of industrialization as indicated by data shows lack of stability over time, there is lack of definite breakthrough overtime.

Domestic credit to private manufacturing sector is a good indicator for financial inclusion for the manufacturing industries. Credits to this sector shows a growing trend over time with few falls especially for South Africa, Egypt and Ethiopia. The rest of the countries (Nigeria, DRC, Tanzania and Kenya) show a prolonged lack of growth in domestic credits to manufacturing in the private sector (see Figure 2).
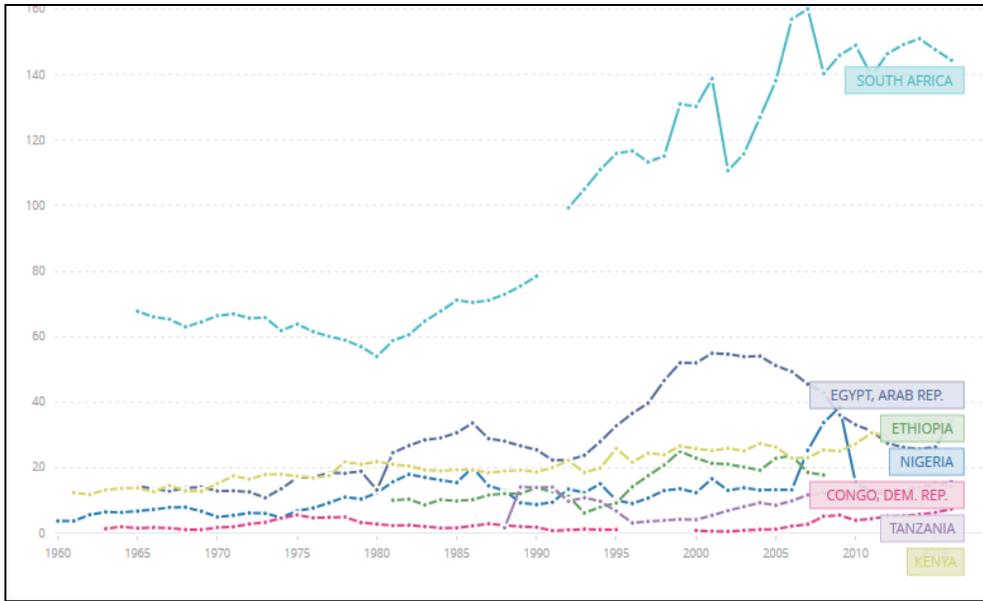
Figure 2: Dometic credits to private sector (% of GDP)

In this second part the study presents the empirical regression result to reflect the main findings of the article. The regression analysis finding indicates that cluster size promotes industrial growth. The more industries are in clusters they tend to grow. Therefore, this result indicates that industries that are in clusters especially large clusters produce more and growth more than otherwise (Table 1). The result in the analysis is not only statistically significant at 0.01 level but also economically large (+2.751). This finding is consistent to Long and Zhang (2011) who also found that clustering lead to higher industrial performance, increased export, and the breeding of new industries within the clusters. The financial inclusion size was negatively related to industrial growth, the results were statistically significant at 0.05 level and economically (-2.587) large as well.

Table 1: Regression Analysis

| Model	(1)	(2)	(3)
Dependent variable	I_GROWTH	I_GROWTH	I_GROWTH
C_SIZE	2.493**	2.533**	2.751**
F_SIZE	-2.528*	-2.221*	-2.587*
F_INCL	0.484	1.334	1.033
I_AGE	0.301	0.557	0.459
c.F_SIZE#c.F_INCL		-0.004	
c.C_SIZE#c.F_INCL			-0.003
N	270	324	324
r2	0.657	0.703	0.680
r2_a	0.243	0.315	0.263
rmse	11.33	10.78	11.18
F	1.588	1.814	1.631
	Standardized beta coefficients, $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.		

Therefore, financial inclusion size determines industrial growth negatively. This hints to the possible impact of inefficient financial system with less financial inclusion size due to high interest rates in these economies that might not be beneficial to industrial growth. On the other hand, financial inclusion variable though statistically significant at 0.1 level, it is economically large (+1.033) implying that the more industries are involved in using the financial system the more likely economies would realize the hope of industrial growth. This later finding supports evidence from other studies such as Levine (2005) and Long and Zhang (2011) who found that financial system and inclusion promoted economic growth and industrial growth process respectively.
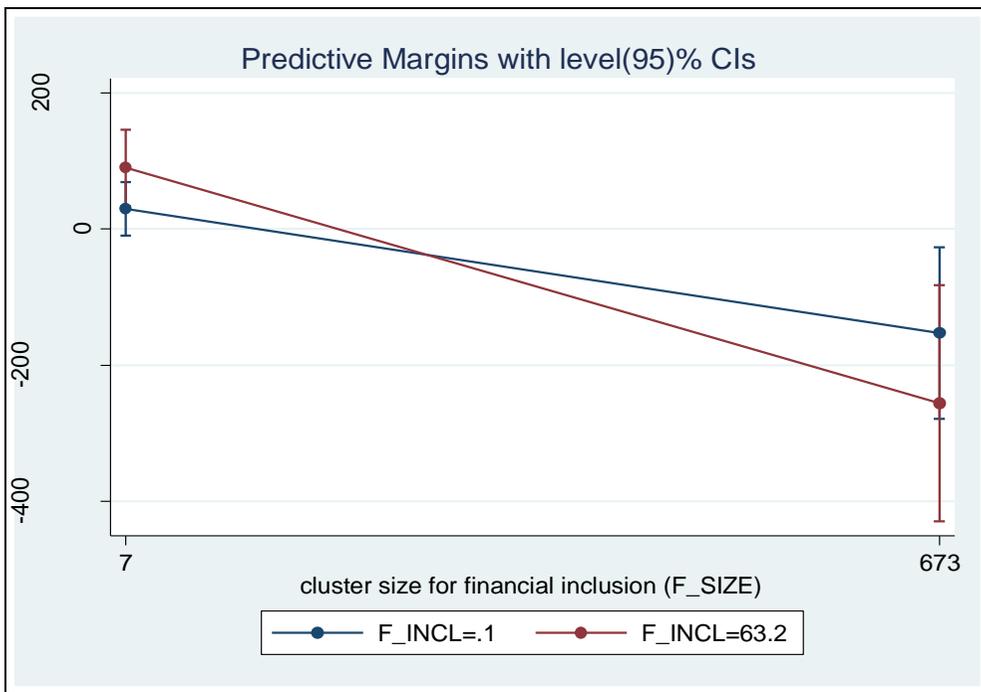
Figure 3: High-Low Graphs for F_INCL and F_SIZEInteraction Effects.

Age of industries (proxying experience) positively affect industrial growth, the results were not statistically significant. Nevertheless, the positive relationship hint to the fact that the older the cluster is the more industrial growth is to be expected. The interaction/moderation effect (c.F_SIZE#c.F_INCL), between financial inclusion (F_INCL) and clustering (F_SIZE) indicates a negative effect on industrial growth, the result was statistically significant at 0.1 level. Because c.F_SIZE#c.F_INCL is negative, then the more negative financial inclusion clustering (F_SIZE) is, the more negative the effect of financial inclusion (F_INCL) on industrial growth becomes and vice versa (see Figure 3; a high-low graph).

Alternatively, F_SIZE exacerbate the negative effects of F_INCL on industrial growth (I_GROWTH) statistically significant at 0.1 level. This help to point to the fact that, when the financial system is not rightly tuned to benefits industrial growth, it will in turn harm it, one reason could be high interest rates that are above returns on investments done by these industries.
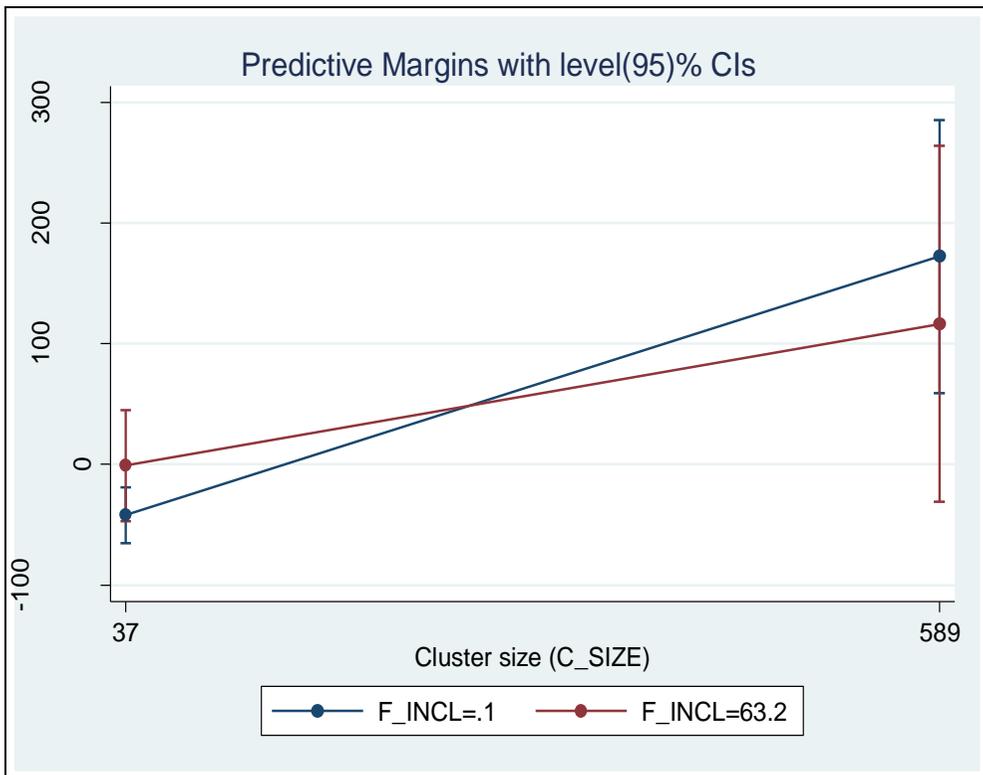
Figure 4: High-Low Graphs for F_INCL and C_SIZE Interaction Effects.

Conversely, in the same vein, interaction/moderation effect (c.C_SIZE#c.F_INCL), between financial inclusion (F_INCL) and clustering (C_SIZE) indicates a negative effect on industrial growth and was statistically significant at 0.1 level. Because c.C_SIZE#c.F_INCL is negative, therefore the more negative clustering size (C_SIZE) is, the more positive the effect of financial inclusion (F_INCL) on industrial growth becomes and vice versa (see Figure 4; a high-low graph). Alternatively, C_SIZE exacerbate the positive effects of F_INCL on industrial growth (I_GROWTH). This help to point to the fact that, when the financial system is more open to firms, the larger the clusters, it benefits industrial growth.

At least 68% of the effects on industrialization is explained by these factors, especially the significant ones.

This is a big proportion indicating that these factors, particularly industrial clustering, financial inclusion and industrial experiences (I_AGE) are important if these economies are to succeed in propelling industrialization process.

The hypothesis test results were as follows;
H1: Firms clustering promote industrial growth in Africa (confirmed)
H2: Financial inclusion promote industrial growth in Africa (not confirmed)
H3: Interaction of financial inclusion and financial inclusion size promote industrial growth in Africa

H4: Interaction of financial inclusion and firm clustering promote industrial growth in Africa (not confirmed)

Conlusions and Recommendations
Government and particularly local governments need to consider effects of business clustering on industrial growth; policies need to be in place to address and plan how best to cluster industries for mutual benefits so that they grow together. More policy dressing needs to be done on how clustering and financial inclusion could reinforce each other. Long and Zhang (2011) study found that clustering and financial development reinforce each other in promoting industrial growth. But, the current study's finding indicates that the African economies are just not yet there, either the financial system or clustering or both are not righly tuned. The businesses do not collaborate in a symbiotic mutual benefits for industial growth.

Further research needs to look at how the different aspect of industrial clustering such as, size, proximity, type and shape may foster industrial growth. These may be studied and assessed for effects on industrial growth.

The size of financial inclusion is negatively affecting industrial growth, more research needs to probe into the problem and explore this type of effect, or some explanatory study design to explain this type of effect. More need to be researched on how best clustering in connection with financial inclusion could be tuned for a better industrialization experience. The factors studied in the current research accounts for a large contribution to industrial growth ($r2 = 68\%$), policy research need to look at these factors more closely in search for how best to manipulate these factors for successful industrialization.

References

Agarwal, A. (2010). Financial deepening, financial inclusion: Challenges and opportunities. 23rd Skoch Summit.

Agbenyo, W., Jiang, Y.S. and Antony, S. (2019). Cointegration Analysis of Agricultural Growth and Financial Inclusion in Ghana. *Theoretical Economics Letters*, 9, 895-911.

Allen, F., Carletti, E., Cull, R., Qian, J. Q., Senbet, L. & Valenzuela, P. (2014). The African financial development and financial inclusion gaps. *Journal of African economies*, *23*(5), 614-642.

Barkley, D. L. & Henry, M. S. (2001). *Advantages and disadvantages of targeting industry clusters* (No. 630-2016-41380).

Beck, T., Demirguc-Kunt, A. & Martinez Peria, M. S. (2006). *Banking services for everyone? Barriers to bank access and use around the world*. The World Bank

Dev, S. M. (2006). Financial Inclusion: Issues and Challenges. *Economic and Political Weekly, 41*(41), 4310-4313. Retrieved 01 06, 2018, from http://www.jstor.org/stable/4418799

Efobi, U., Beecroft, I. & Osabuohien, E. (2014). Access to and use of bank services in Nigeria: Micro-econometric evidence. *Review of development finance*, *4*(2), 104-114.

Ezzahid, E. & Nihou, A. (2017). *Capital deepening and efficiency in Morocco.* Mohammed V University, Faculty of Law and Economics. Rabat: Munich Personal RePEc Archive (MPRA). Retrieved June 20, 2018, from https://mpra.ub.uni-muenchen.de/82143/

Fofack, H. (2008). *Technology Trap and Poverty Trap in Sub-Saharan Africa.* Policy Research Working Paper, The World Bank, World Bank Institute: Poverty Reduction and Economic Management Division . Retrieved June 20, 2018

Hannig, A. & Jansen, S. (2010). *Financial inclusion and financial stability: Current policy issues.* ADBI working paper series, Asian Development Bank Institute (ADBI), Tokyo.

Juan, P. (2019). Research on the Integration of Urban Clusters, Industrial Clusters and Industrial

Parks. 2019 5th International Conference on Economics, Management and Humanities Science (ECOMHS 2019)

Kalunda, E. (2014). Financial inclusion impact on small-scale tea farmers in Nyeri County, Kenya. *World Journal of Social Sciences*, *4*(1), 130-139.

Levine, R. (2005). Fianance and Growth: Theory and Evidence. In P. Aghion, & S. N. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1A, pp. 865-934). Providence, USA: Elsevier B.V. doi:10.1016/S1574-0684(05)01012-9.

Long, C. & Zhang, X. (2011). Cluster-Based Industrialization in China: Financing and Performance. *Journal of International Economics, 84*(1), 112-123.

Mohan, R. (2006). Economic growth, financial deepening, and financial inclusion. *Dynamics of Indian Banking: Views and Vistas*, 92-120.

McCormick, D. (1999). African enterprise clusters and industrialization: theory and reality. *World development*, 27(9), 1531-1551.

Population Division. (2017). *World Population Prospects: The 2017 Revision, DVD Edition; historical data.* Gapminder, United Nations, Department of Economic and Social Affairs. Gapminder, UN Population Division. doi:https://esa.un.org/unpd/wpp/Download/Standard/Population/

Porter, M. (1990). *The competitive advantage of nations*. New York: Free Press.

Porter, M. E. (2000, February 1). Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly, 14*(1), 15-34.

Ramachandran, V. (2014). *Productivity, Jobs, and Growth in Africa: Six Pieces of the Puzzle.* Center for Global Development, Development Policy Research Unit. World Bank Group. Retrieved June 20, 2018

Ray, S. (2019). What explains India's poor performance in garments exports: evidence from five clusters? Working Paper 376, Indian Council For Research On International Economic Relations.

Shahbaz, M., Bhattacharya, M. & Mahalik, M. K. (2017). *Financial Development, Industrialisation, Urbanisation and the Role of Institutions: A Comparative Analysis between India and China.* Munich Personal RePEc Archive. MPRA. doi:DOI: 10.1080/00036846.2017.1383595

Shakya, M. (2009). Clusters for competitiveness: A practical guide and policy implications for developing cluster initiatives. *Available at SSRN 1392479*.

Trabelsi, M. & Cherif, M. (2016). *Capital Account Liberalization and Financial Deepening: Does the Private Sector Matter?* Université de Reims Champagne Ardenne (URCA). Giza: Economic Research Forum (ERF).

Vlachos, J. & Waldenström, D. (2002). *International Financial Liberalization and Industry Growth.* SSE/EFI. SSE/EFI.

World Bank. (2010). *Innovation Policy: a guide for developing countries*. World Bank Group.

Zhu, X., Liu, Y., He, M., Luo, D. & Wu, Y. (2019). Entrepreneurship and industrial clusters: evidence from China industrial census. *Small Business Economics*, *52*(3), 595-616.

Zhou, X., Zhao, D. & Lv, Y. (2019, April). Research on the Interactive Development of Industrial Clusters and Small (Cities) Towns with Characteristics in Western Regions Taking the Development of Traditional Chinese Medicine Industrial Clusters in Xianyang City of

Shaanxi Province as an Example. In *3rd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE 2019)*. Atlantis Press.

Zeng, D. Z. (2012). China's special economic zones and industrial clusters: The engines for growth. *Journal of International Commerce, Economics and Policy*, *3*(03), 1250016.