Industrialization Pathways to *Human* Development: Industrial Clusters, Institutions and Multidimensional Poverty in Nigeria[1]

Oyebanke Oyelaran-Oyeyinka
Columbia University, New York, U.S.A

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Abstract

This paper takes productive industrial clusters as an embodiment of industrial dynamism, productivity and growth and poses the question if and how these clusters can alleviate poverty among employees as evidenced by an improvement in employee living standards in Small and Medium Enterprises in Africa. Drawing on the concepts of industrial clusters and multidimensional poverty to guide the study, new empirical data collected during field research at the case cluster – the Otigba Information and Communications Technologies (ICT) cluster in Lagos, Nigeria – is used to understand the nature and depth of deprivations in this seemingly productive economic agglomeration. Study findings reveal the following: first, clustering has positive impacts on standard of living as a significant percentage of employees within the cluster indicate an increase in living standards since working in their firms. Further, more than half of respondents agree that workers in the cluster are faring better financially than those doing the same work outside the cluster. Second, using multidimensional poverty and slum household indicators as standardized measures of living standards, results show that more than half of the employees use improved water, sanitation and cooking fuel options, while possessing assets such as radios, refrigerators and televisions. Third, subjective (self-reported) and objective indicators of multidimensional poverty corroborated one another; the self-reported poor faring less on most poverty indicators than the self-reported rich. The paper recommends that industrial and social policy take cognizance of the role of entrepreneurial clusters in reducing unemployment and poverty, incorporate them into national economic development agendas, and make considerable effort to understand their various vulnerabilities while supporting and enhancing their productivity.

Key words: multidimensional poverty, industrial clusters, living standards, labour

[1] This paper pulls from a larger doctoral work: Oyelaran-Oyeyinka, O. Industrialization Pathways to Development: Industrial Clusters, Institutions and Poverty Eradication in Nigeria, Columbia University, U.S.A (forthcoming). It highlights the data and findings that relate to the multidimensional poverty aspect of the dissertation. Additional data on living standards, non-income benefits, social protection, firm collaboration, infrastructure, expenditures on multidimensional indicators, from both employees and owners and managerial staff were collected during field research for the study.

Introduction

Over the past decade, Sub-Saharan African countries have recorded impressive growth rates, yet for most, human development indicators remain dismal. According to the Organization for Economic Co-operation and Development (OECD, 2013), the economies of developing countries have been growing at rates that supersede that of the OECD countries since the mid-1990s. "… since 2003 more than half of the world's economic growth has derived from non-OECD countries; by 2011, non-OECD economies accounted for more than 45 percent of world Gross Domestic Product (GDP, in purchasing power parity [PPP] terms)" (p. 6). African economies in particular have collectively been experiencing good growth, marked with a few lows. For example growth rate on the continent from 2002 to 2008 averaged 5.6 percent, fell to 2.2 percent in 2000 due to a rise in food and fuel prices, and as well the global financial crisis. However, average growth rate rose to 4.6 percent in 2010, and was at 5 percent in 2012. This remarkable economic growth can be attributed to such things as improved domestic demand as income and urbanization levels rise, increase in public spending particularly on infrastructure, favorable weather leading to bumper harvests, economic recovery after conflict in several countries, and trade and investment with emerging economies who are investing in the natural resource and extractive industries (ECA and AU, 2013).

Unfortunately, this growth is still largely driven and characterized by a heavy dependence on the production and export of commodities, few backward and forward linkages, local industries that add little value, and no economic diversification (ECA and AU, 2013). The manufacturing value added (MVA),[2] measured as percent of GDP, in Sub-Saharan Africa was last reported at 11 percent in 2011. This has dropped from 15 percent in both 2000 and 2001. These figures are however still below the rule of thumb that specifies 25 percent level for meeting the condition of industrialization (UNIDO, 1975).[3] For the East Asia and Pacific region, the MVA for 2000 and 2011 were 24 percent and 20 percent respectively. Considering only the developing countries[4] in

[2] "Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs" (World Bank website, 2013).

[3] This point was reiterated that "Only when a minimum of 25 percent of GDP emanates from the industrial sector, will Africa be able to achieve the desired economic growth rate, jobs creation and economic transformation that is needed to eliminate poverty" (News24Kenya, 11 June 2013).

[4] The 23 countries in this category of "developing only" include American Samao, Cambodia, China, Fiji, Indonesia, Kiribati, Korea (Dem. Rep.), Lao DPR, Malaysia, Marshall Islands, Micronesia (Fed. Sts), Mongolia, Myanmar,

the region, the figures are even higher at 31 percent for 2000 and 29 percent for 2010 (World Bank, World Development Indicators, 2013).

The fact that economic development in Africa is not being driven by structural changes and deepening manufacturing means it has been lacking in driving employment growth and overall improvement in human and social development. The impressive economic performance on the continent has not resulted in generating the much-needed jobs and income to curb high unemployment levels (including rising youth unemployment) and poverty (ECA and AU, 2012, p. 3; Martins, 2013). Furthermore, while there have been achievements in certain areas including education, child and maternity mortality rates, and gender equality, the pace of change is still too slow, making it unlikely for African countries to attain social development goals, such as some set by the Millennium Development Goals before the 2015 end date.

Nigeria in particular typifies a country in this prosperity – poverty conundrum. While its economic growth indicators have been good, human development indicators have been poor. In the past decade, the country experienced relatively rapid growth with an average growth in GDP from 2005 to 2010 of 6.68 per cent however the estimated real growth rate for 2011 was 7.36 per cent (NBS, 2012). The recent rebasing of the GDP has made the country the 26th largest economy in the world and the biggest in Africa, with a GDP of US$510 billion (Faul, 2014). On the other hand, in 2012, Nigeria had a human development index (HDI) position of 153 out of 187, with an index of 0.471, placing it in the low human development category. The inequality-adjusted index (IHDI) was even lower at 0.276. As at 2008, the country's Multidimensional Poverty Index (MPI) figure was 0.31 (UNDP, 2013).

Unemployment, poverty, and inequality figures are also dismal, with the unemployment rate as at 2010 being close to 20 per cent (Agu and Evoh, 2011, p.16). From data compiled from the National Bureau of Statistics (NBS), national poverty levels were 54.4 per cent, with a total of about 71.3 million people considered poor as at 2004 (Ibid, 2011). In terms of inequality, "[b]etween 1985 and 2004, inequality in Nigeria worsened from 0.43 to 0.49, placing the country

Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Timor-Leste, Tonga, Vanuatu and Vietnam (World Bank).

among those with the highest inequality levels in the world" (UNDP, 2008/9, p.11). This is in spite of increased growth that has been experienced in the past decade. "Thus, 2001-2010 was indeed a decade of jobless growth for the country given those years of economic growth was not translated to more wage employment opportunities and poverty reduction" (Agu and Evoh, 2011, p, 16).

One of the pathways for triggering industrial transformation has been the promotion of industrial clusters, which are increasingly seen as a viable solution for economic growth and competitiveness in developed as well as developing countries where poverty, unemployment and inequality still remain significant (Bianchi, Miller & Bertini, 1997, Schmitz & Nadvi, 1999). This paper highlights how productive industrial clusters in developing countries might impact the welfare of the workers employed within them. It specifically asks if and how these clusters can alleviate poverty among employees as evidenced by an improvement in employee living standards in Small and Medium Enterprises (SMEs) in Africa.

It employs a methodological framework that combines survey questionnaires, subjective versus objective measures of living standards, diverse informant interviews, archival research and statistics analysis with the case study at the heart of it. Drawing on the concepts of industrial clusters and multidimensional poverty to guide the study, new empirical data collected during field research at the case cluster – the Otigba Information and Communications Technologies cluster in Lagos, Nigeria – is used to understand the nature and depth of deprivations in this seemingly productive economic agglomeration.

The paper is organized as follows – the next section gives the theoretical case on how industrialization and industrial clusters in particular lead to growth. Next, we set out the methodology for exploring how industrial clusters lead to poverty alleviation, providing the background on our case study and explaining multidimensional poverty and slum household indicators. Following this is a discussion of the results based on the empirical data on the Otigba case. The final section summarizes the paper, and provides implications for policy and areas for future research.

Manufacturing Growth and Cluster-Based Industrial Development

The manufacturing sector has long been recognized as an engine of growth and catch-up in developing countries. The faster the growth rate of manufacturing output, the faster the growth rate of: GDP, which correlates highly with rising income; manufacturing labour productivity, due to increasing returns; high skills and specialization; direct and indirect employment, job creation and lower prospects of structural unemployment (Kaldor, 1966, 1967). Moreover, linkage and spillover effects are stronger in manufacturing than other sectors. The evidence from analysis of studies experiencing rapid catch-up after 1973 shows the importance of manufacturing as an important engine of growth and catch up, hence a generator of employment in developing countries (Fagerberg and Verspagen, 2002; Kathuria and Raj, 2010; Szirmai, 2009 *inter alia*).

Growth is therefore conceived as an outcome of increased employment in productive activities and by extension improved living standards. Indeed, manufacturing contributes to growth in various ways. First, manufacturing productivity commands higher wages and remunerations than that associated with the agricultural sector, thus contributing more to improved living standards. Second, the contribution of manufacturing to improved livelihoods is indirect via forward and backward linkages. In most economies, industrial manufacturing accounts for about 16 to 20 percent of total employed labour force (Lavapo and Szirmai, 2012). Thirdly, industrial activity contributes to employment through induced Keynesian style multiplier effects in both demand and supply sides (Tyler, 1976; McMillan and Rodrik, 2011). According to some estimates, for every job created in manufacturing there is a multiplier effect of between five to twenty indirect jobs (UNIDO, 2012). The corresponding rise in income as a result of increased levels of employment stimulates spending thereby creating further demand and investments. Clearly, a structural shift from agriculture to industry is a certain pathway out of poverty because it creates diverse avenues for wage employment. In the UNIDO study cited above, of the BRICS countries studied, China, which recorded an unprecedented expansion of its manufacturing contribution to GDP (from 22 percent in 1987 to 45 percent in 2008) achieved equally dramatic reduction in poverty. Notably, growth in Asia was most poverty reducing than in any other part of the world.

The agglomeration of firms can be seen as one channel through which manufacturing growth enhances industrial activity and employment creation. This is pertinent for developing countries, where small and medium enterprises (SMEs) tend to be the main contributors to national productivity and manufacturing. Clusters in developed countries attracted the attention of scholars in the late 1980s and early 1990s when stories of how small-scale industrial districts in Europe, especially in Italy, were producing competitive products for the international markets in the 1970s and 1980s became widely-known. For developing countries, the question thus arose as to whether similar industrial clusters existed, and under what conditions they either produce, modify or prevent their growth (Schmitz and Nadvi, 1999). Findings revealed that there was a significant amount of industrial clustering in developing countries, characterized by a wide variation in their growth experiences and pronounced internal heterogeneity (Otsuka and Sonobe, 2011; Schmitz and Nadvi, 1999).

The term 'cluster' has been conceptualized in a variety of ways. Porter (1990) put forward the notion of 'cluster' as a group of firms operating in a national economy. Schmitz's (1992) definition of a cluster emphasizes geographical proximity. This study adopts McCormick and Oyelaran-Oyeyinka's (2007) definition of a cluster which characterizes them as a sectoral and geographical concentration of enterprises, and emphasizes inter-firm and collective learning approaches. This definition which emphasizes geographical proximity is more appropriate for developing country contexts, typically characterized by "poor infrastructure, frail information systems and cultures that place high importance on face to face communication" (McCormick, 1998, p. 4) Similarly, different typologies[5] of clusters exist giving evidence of their diversity in technical and production features, depth of skill and knowledge, historical origin, formation trigger factors, policies that sustain/hinder them, and the institutions within which they are embedded.

[5] Some other typologies include Pederson (1997) – the diversified industrial cluster, subcontractor cluster, market town or distribution centre and specialized petty commodity cluster (cited in McCormick, 1998); Markusen (1996) – the Marshallian New Industrial District (NID), with its recent Italianate variety, the hub-and-spoke district, the satellite industrial platform and the state-centered district; McCormick (1999) – groundwork cluster, industrializing cluster and complex industrial cluster.

This idea of industrial districts is not novel, and was put forward by Alfred Marshall (1890) using "the concept of external economies" (cited in Schmitz 1999, p. 468). Moving from Marshall's conceptualization on clustering, Schmitz and Nadvi (1999) assert that incidental external economies alone is not sufficient to explain cluster dynamism. They thus introduce the collective efficiency framework – a concept that brings together the incidental (external economies) and deliberate (joint action) efforts of the clusters:

> Incidental external economies are of importance in explaining the growth of contemporary industrial clusters, but there is also a deliberate force at work, namely consciously pursued joint action … [Joint action] can be of two types: individual enterprises cooperating (for example, sharing equipment or developing a new product), and groups of firms joining forces in business associations, producer consortia and the like. Cutting across this distinction, one can distinguish between horizontal cooperation (between competitors) and vertical cooperation (between producer and user of inputs or between producer and seller of outputs). (Schmitz, 1999, p. 469).

Porter (1998) highlights the ubiquitous nature and critical role of the locality in maintaining comparative competitive advantage, in spite of an increasingly globalizing world. He articulates, "[w]hat happens *inside* companies is important, but clusters reveal that the immediate business environment *outside* companies plays a vital role as well" (p. 78). Within a cluster, firms are able to enjoy access to "a pool of specialized workers, easy access to suppliers of specialized inputs and services and the quick dissemination of new knowledge" (Schmitz and Nadvi, 1999, p. 1504). This is the external economies that Marshall conceptualized. In sum, firm localization garners specific benefits to them: improved market access, which allows firms to increase production; improved potential for technological upgrading; joint action which allows firms to deal with external shocks particularly from the global economy; easy flow of and access to information; and finally, it enables firms "to make good use of relatively small amounts of resources" (McCormick, 1999, p. 1545). Clustering also helps firms to reduce transaction costs between actors in a business exchange including manufacturers, suppliers, traders and consumers (Otsuka and Sonobe, 2011).

Notably, the process of successful industrial development across industries and countries have been driven by the development of enterprise producing similar and closely related products located in an area – industrial clusters (Sonobe, 2014). According to Sonobe (2014) a commitment to poverty reduction is evident in efforts geared towards creating employment opportunities, which increases the volume of productive activities as well as percentage of the population responsible for such activities. In most cases, this would necessitate a proliferation of opportunities in labour-intensive production. The hitherto failed industrialization of Africa necessitates cluster-based industrial development which by its nature is inclusive since clusters are open and easy to access by new entrants of whatsoever scale of production (Ibid., 2014). Drawing on successful industrial development cases from emerging and South East Asia countries, Otsuka and Sonobe (2011, p. 6) propose an entrepreneur-led, government assisted approach, consistent with "the theoretical proposition of Rodriguez-Clare (2007) that the best policy entails the direct promotion of clustering in the sector in which the country has a comparative advantage." Indeed this strategy might serve to improve firm productivity, thus reducing the isolation that many SMEs face in developing countries.

Empirics on Industrial Clusters and Poverty Alleviation

While the role of industrial clusters in fostering growth and productivity is evident in the regional agglomeration literature, studies that systematically and explicitly link industrial clusters to poverty are limited. Nadvi and Barrientos (2004) acknowledge this hiatus while almost a decade later, Fowler and Kleit (2013) note that the need for a specific establishment of the relationship between local clusters and poverty alleviation is emerging. Fowler and Kleit (2013) found industrial clusters to be associated with lower poverty rates in the United States of America.

Several points can however be raised in analyzing the role and possibilities for industrial clusters to improve labor's welfare. Firstly, following the arguments expatiated on earlier in this chapter for manufacturing leading to growth and employment, industrial clusters as an unique form of industrial organization do have the potential of eradicating poverty by reducing the industrial isolation that SMEs in developing countries face, and providing employment for workers (Mano et. al, 2011; Weijland, 1999). The more efficient and dynamic firms have the propensity to be

more productive, and therefore hold greater possibilities for workers to increase their income and well-being. However it is worth mentioning again that productivity might be a necessary but not sufficient condition to alleviate poverty (Srinivas, 2009). As Nadvi and Barrientos (2004) point out, the relationship between poverty alleviation and industrial clusters depends on the cluster's features (cluster's location, the type of firms within it, and type of employment generated), processes (agglomeration gains, joint action, cluster institutions and social capital) and dynamics (cluster growth, upgrading, and differentiation). In other words, clusters are different and their individual features, processes and dynamics would determine their impact on poverty, to whom, and how sustainable it would be. For example, incipient, survival, rural based and informal urban clusters which employ low-skills and technology might help to generate employment, have low barriers to entry, but they might not survive in the face of intense external competition. In Africa for instance one finds that there are not a lot of successful clusters (McCormick, 1999, p. 1547). Many of these clusters are groundwork[6] and industrializing cluster that have not attained the status of industrialized clusters. The clusters that fall in the complex cluster category tended "to be smaller and less well developed than their counterparts in other parts of the world." She further notes "collective efficiency, with its emphasis on the internal dynamics of clusters, cannot fully explain Africa's lack of complex clusters" as there was need to look at the "social and economic environment for clustering," and other barriers which reduce "the power of the clustering dynamic."

Second, improvements in a cluster through technology upgrading, can make it more productive and dynamic, and since technologically superior firms tend to be more profitable, they have a better chance of eradicating poverty by providing employment and higher wages for workers. Kimura (2011, p. 2105) narrates how a "traditional handicraft village" in northern Vietnam was transformed into a "modern industrial cluster, through the diffusion of mechanized production over the last 20 years... During the modernization process, annual *per capita* income of the village increased from 400USD in 1995 to around 2000 USD in 2005. The process also created employment opportunities for the surrounding agricultural villages: the paper factories in the

[6] McCormick (1999) offers three categories of African clusters – "groundwork" clusters, which lay the foundation for industrialization, prepare the way for the emergence of collective efficiency, and exemplify most of the clusters in Africa. Some are "industrializing" clusters, which "begin the process of specialization, differentiation, and technological development," while fewer are "complex" industrial clusters, which "produce competitively for wider markets" (p.1531).

village employed around 5000 workers from the village and its surrounding districts." It is notable that kinship networks were instrumental in helping to disseminate the knowledge of the new technology and sometimes providing the initial investment needed to adopt it.

Thirdly, governments can and do play a critical supportive role in encouraging the formation of a cluster, promoting upgrading, supply of dedicated public goods (power, roads, water skills training and so on) and providing an enabling environment for the cluster by policy and establishing institutions where they are weak or absent (Chari, 2000; Mano et. al., 2011; McCormick 1999; Mehrortra and Biggeri, 2005; Weijland, 1999). In particular, Mehrotra and Biggeri (2005, p.1737) write that "without external intervention (collective and/or public action), a poor household may remain at best in a status quo of human capabilities, and there will be an intergenerational transfer of a poverty trap (Mehrotra & Biggeri, 2002a)." Mano et. al (2011, p. 1762), also speak of government policies support to the flower industry:

> The strong initiative of the Ethiopian government has also contributed to the development of the cut flower industry. The government exempted taxes for inputs, revised the investment law for foreign investors, leased land with basic utilities at low prices, and provided special loans through the Development Bank of Ethiopia. As a result, the investment climate in Ethiopia has drastically improved over the past few years, which has led to a huge capital inflow into the Ethiopian cut flower industry.

Similarly, as previously discussed, an important hallmark that guides the concept of industrial clusters is collective efficiency. Collective efficiency is the concept that brings together the incidental (external economies) and deliberate (joint action) efforts of the clusters (Schmitz and Nadvi, 1999). Workers within clusters are likely to acquire superior skills through constant interactions with competent peers and these skills and competencies, can lead to improvement in performance and productivity in firms (Chari, 2000; Mano et. al., 2012). Personal, kinship and social networks can be beneficial in gaining useful employment, much in the same way it helps in the diffusion of knowledge, and provision of capital for the adoption of a technology (Mano et. al, 2011; Kimura 2011). In addition, learning and upgrading can also be attained through social networks, and from multiple and domestic and regional value chains as opposed to single,

and global value chains (Navas-Alemán, 2011), while trade and professional associations can also be useful in helping to overcome poverty traps in their advocacy role for better wage and working conditions (Mehrortra and Biggeri, 2005).

Thus through various mechanisms and institutions including the state, the firm's productivity and dynamism, and social networks, firms in productive industrial clusters have the potential to improve the living standards of their workers, and therefore merits both scholarly and policy attention.

Notably, this study moves beyond the traditional emphasis on income poverty (commonly measured by number of people living below $US1 or $US2 per day) to analyze poverty within a multidimensional poverty framework. The multidimensional poverty index (MPI) is a relatively new data set (Alkire and Foster, 2009), and comprises ten indicators that correspond to the three dimensions – education, health and living standards[7] – of the Human Development Index (though wider in scope), and "captures a set of direct deprivations that batter a person at the same time" (Alkire and Santos, 2010). Table 1 below shows the MPI index for select African countries. Taking a close look at the six African economies that were part of the world's top ten[8] fastest growing economies between 2001 and 2010, we find all have MPI figures greater than 0.31 (Economist, 2011). There are growing number of studies that have commenced employing the multidimensional poverty approach on Nigeria (Ataguba, Fonta, and Ichoku, 2012; Oyekale, Okunmadewa, Omonona, and Oni, 2009; Oyekale and Oyekale, 2013) and Sub-Saharan Africa (Batana, 2008).

Table 1: Multidimensional Poverty Index, for select African Countries

Country	MPI	Country	MPI	Country	MPI
Benin	0.412	Congo	0.208	Congo (DR)	0.392
Burkina Faso	0.535	Gambia	0.324	Cote d'Ivoire	0.353
Burundi	0.53	Ghana	0.144	**Ethiopia**	**0.564**
Cameroon	0.287	Guinea	0.506	Kenya	0.229
Chad	**0.344**	Madagascar	0.357	Malawi	0.334
Lesotho	0.156	Namibia	0.187	Mali	0.558

[7] MPI Indicators: Health – child mortality & nutrition. Education: years of schooling & child enrolment. Standard of living: Electricity, drinking water, sanitation, flooring, cooking fuel & assets.

[8] The countries and their annual average GDP growth, % were: Angola (11.1), China (10.5), Myanmar (10.3), Nigeria (8.9), Ethiopia (8.4), Kazakhstan (8.2), Chad (7.9), Mozambique (7.9), Cambodia (7.7) and Rwanda (7.6)

Liberia	0.485	**Nigeria**	**0.31**	**Mozambique**	**0.512**
Mauritania	0.352	Sierra Leone	0.439	Niger	0.642
Sao Tome &P	0.154	Tanzania	0.332	**Rwanda**	**0.35**
Somalia	0.514	Uganda	0.367	Senegal	0.439
South Africa	0.057	Zambia	0.328	Togo	0.284
Swaziland	0.086			Zimbabwe	0.172

Source: Alkire, Conconi, and Roche, 2013 Notes: MPI, various years (Low=0, High=1)

Data and Methodology

In order to demonstrate if and under what conditions productivity and growth can help alleviate poverty and improve living standards, we use the case of the *Otigba* Information and Communications Technologies Cluster in Lagos, Nigeria, also called *Otigba* or Computer Village. The study adopted several methodological techniques including the use of survey questionnaires, archival research, and formal and non-formal interviews. While a single core case study was used, research drew on both primary and secondary data, and was complemented and enriched through secondary literature.

Otigba was chosen as an appropriate case for several reasons. First, preliminary investigations helped to corroborate the choice of the selected case study. Initial site visits were made to the Kamakunji Metalworks Cluster in Nairobi, Kenya (which was originally under consideration for this study), and *Otigba*. In comparison to the former, *Otigba* had more dynamism, and variability of firms and workers to define and organize this study. As opposed to many African clusters characterized by low skill, and employing low technology manufacturing techniques, *Otigba* employed both low and high skilled labour, had high prospects of further upgrading, possessed necessary technological dynamism and seemingly held the potential for wealth generation and poverty alleviation. A subsequent pilot study at *Otigba* provided persuasive evidence that it had a positive impact on living standards. In addition, the cluster had a melange of Nigeria's ethnic nationalities, all with different approaches to business, learning and collaborative behaviour.

Secondly, the structure of the industry in *Otigba* was highly heterogeneous comprising small, medium, and large firms;[9] rendering different services with ownership structures that were

[9] The Small and Medium Enterprise Development Agency of Nigeria (SMEDAN, 2005) breaks down firm sizes in terms of numbers of employees, into micro (1-15), small (16-50) and medium (50-200).

highly diverse as well. This variability further argued for the choice of the cluster, as it would contribute towards understanding how different size firms with varying types and levels of skills, capabilities and policies led to diverse living standard outcomes for their workers. In addition, while the literature places the state as a central actor in fostering cluster growth, the cluster itself had experienced poor state support, while formal institutions for social protection for informal workers tended to be weak. It therefore served as a good case to examine how firms passed on benefits to workers in the absence of institutional regulations that mandated and enforced the delivery of social protection to workers.

Surveys were used in the study to enhance a general understanding of the *Otigba* cluster and were administered to both employees and employers. Two types of questionnaires were constructed and administered – one targeted to employees and the other to owners/CEOs and managers of the companies. This paper will highlight results from the employee surveys. The questionnaires enabled respondents and their firms to be anonymous by not requiring their names or the name of their firms. Given the sensitivity of some of the questions i.e. on poverty, living conditions and firm particular data, anonymity was given to encourage truthfulness in responses. Initial interviews and a pilot survey were designed to feed the development of the final survey questionnaire. A total of 40 questionnaires were analyzed from the pilot survey. The initial site visit was followed by a separate visit in March 2012 during which the pilot survey[10] was carried out. The pilot survey was then improved upon and changed to reflect the more specific concentration of the study. Questions that were not properly answered or that did not contribute to the analysis in the pilot survey were removed or modified.

Subsequent field research was carried out in July/August 2012, and January to the beginning of March 2013. During these latter visits, data was collected from primary and secondary sources using interviews, survey questionnaires, and general observations of the cluster. Archival research to collect old, and relevant newspaper articles on the cluster and poverty in Nigeria was also carried out. Informants for this study included ICT and non-ICT business owners and employees within the cluster; business owners who had ICT businesses, but were not within the

[10] A taskforce member of the umbrella association at the cluster – the Computer and Allied Products Association (CAPDAN) – assisted in contracting others to disseminate and retrieve the survey questionnaire from selected informants.

geographical location of the cluster; government officials; bank employees; and others who had information and knowledge on the topic. The cluster was categorized in terms of the different types of firms based on products and services rendered. Interviews were then sought with firms that fit into these different types, as well as some of the bigger players in the cluster and ICT industry.

In all, a total of about sixty formal interviews and informal conversations took place, generally face to face. The final surveys were distributed within *Otigba*, and as well to two big players in the industry who were located outside of the cluster. In addition, survey questionnaires were also disseminated via email to members of the Computer Society of Nigeria, and as well at the Lagos and Ijebu-Ode chapter meetings of the Society. The target number of questionnaires to be retrieved was between 150-200, but a total of 257 questionnaires – 101 CEO/Management and 156 employee – were retrieved and examined using basic descriptive analysis as well as Discriminant Analysis.

Living standards were measured both subjectively and objectively. The former were used to gauge the perception of workers on their living standards, while the latter was used to compare living standards in the cluster with standardized (and internationally recognized) indicators of multidimensional poverty and slums indicators. The perceptions of workers were drawn out with such questions as:

Box 1: Sample questions of subjective living standard measurements

About how much do you make on average <u>every week (in Naira)</u>?
a) 0 - 1000 b) 1001 – 5000 c) 5001 to 10,000 d) 10,001-50,000 e) Above 50,000

Has your working in this company raised your standard of living?
a) Yes b) No

Between when you started working here and today, how much has your standard of living changed?
a) Drastically reduced b) Reduced c) Remained the same d) Increased
e) Drastically increased

Between when you started working here and today, about how much has your <u>income</u> changed over time?
a) Drastically reduced b) Reduced c) Remained the same d) Increased
e) Drastically increased

How will you describe your current standard of living compared to your peers?
a) Poor b) Surviving c) Comfortable d) Rich e) Very Rich

⇨ *Please tick either True or False to the following statements, based on your opinion of the Computer Village* (i.e. *Otigba*):

Statement
Workers doing the same work but in different companies in Computer Village get different financial rewards.
Workers in Computer Village are faring better financially than those doing the same work outside of Computer Village.
Job security within Computer Village is good (that is, there is no fear of losing one's job)
Most workers working in Computer Village are very satisfied
Given the opportunity, most workers will go to work outside Computer Village
For most workers, their standard of living improves when they begin working in Computer Village.

Source: Author's survey (2013)

For the standardized measurements, indicators from the standard of living component of the Multidimensional Poverty Index (MPI) and the definition of a slum household as defined by the United Nations Human Settlements Program (UN-Habitat) were used. Drawing from these two concepts, the study gathered data on respondents' electricity, cooking fuel, drinking water, sanitation, cooking fuel, assets, flooring and housing. Table 2 below highlights these different indicators. While this study was influenced by the MPI, it differed in certain ways from it. Firstly, while the target population for MPI surveys are households, this study targets individuals (though some questions might pertain to their households). Secondly, we did not attempt to calculate a single MPI statistic for the cluster as is done for MPI for various countries.

Table 2: Overlap in MPI, UN-HABITAT and Study indicators

MPI standard of living indicators & deprivation criteria	**Study standard of living indicators**	**UN-Habitat slum indicators**
Electricity: If household does not have electricity	*Electricity*: Source of lighting; frequency of public power supply	
Cooking Fuel: If they cook with wood, charcoal, or dung	*Cooking Fuel*: Type of cooking fuel	
Drinking water: If does not meet MDG definitions, or is more than 30 mins walks	*Drinking water*: Amount spent on drinking water; source of drinking water	*Access to improved water*: water that is sufficient, affordable and can be obtained without extreme effort)
Sanitation: If does not meet MDG definitions, or the toilet is shared	*Sanitation*: Access to toilet facilities at home	*Access to improved sanitation facilities*: a private toilet, or a public one shared with a reasonable number of people
Assets: If do *not* own *more than one* of: radio, tv, telephone, bike, motorbike	*Assets*: Ownership of assets; change in personal assets since working in firm	
Flooring: If the floor is dirt, sand, or dung	*Material used to build house*: natural, rudimentary, finished	

	Condition and location of home: in need of major repair, in a hazardous place, on or near toxic waste	*Durable housing*: a permanent structure providing protection from extreme climate conditions
	Sufficient living area: More than 3 people share a bedroom	*Sufficient living area*: no more than three people sharing a room

Source: Alkire, S. and Santos, M. E. (2010, p. 7); UN-Habitat (2008, p. 33); Oyelaran-Oyeyinka, field survey (2013)

The Otigba Information and Communications Technologies Cluster

The Otigba information and communication technologies (ICT) cluster "is an example of self-starting and self-sustaining small enterprises that are in some cases family owned" (Oyelaran-Oyeyinka, 2006, p. 20), providing employment for many including graduates. It originated in the early 1990s on two streets that were designated as residential by the local government, but now occupies eights streets, with Otigba being the largest (Ibid, 2006).

The cluster interestingly lies on a scale ranging between formal and informal. On the one hand, it is viewed as informal by the state government because it is a residential zone turned to a business district by private individuals. On the other hand, it is recognized by the same state government, which relates with it through the umbrella association – Computer and Allied Producers (CAPDAN) – and collects its taxes from the firms. It is a spontaneous cluster, as opposed to a planned one, which are those "induced by public policies, or "constructed" from scratch, and "range from technopoles" and industrial parks to incubators and export processing zones (EPZs)" (Zeng, 2008, p.2). The "stimulus for the growth of the cluster was the relatively high demand for computers and peripherals from businesses and academic institutions – Lagos is home to 60 percent of Nigeria's industrial production and the region also has the nation's highest percentage of educated people and educational institutions" (Abiola, 2008, p. 67).

The major activity of the cluster is the assembly and trade of computer hardware and software and it "has been variously described as the information and communication technology (ICT) hub of West Africa, potentially the biggest ICT market in Africa, and the Silicon Valley of West Africa" (Ibid., 2008, p. 66). From our survey, we find about 64 percent of businesses involved in the sale of new laptops, and 61.5 percent into retailing. Laptop accessories have the 3rd largest number of firms involved (57.1 percent), and installation follows closely (56.4 percent). More than 50 percent (53.2 percent) of firms are however still in the business of cloning computers. A

sizeable percentage (46.2 percent) of firms are also wholesalers, and some sell in bulk to others within the cluster or for re-sale in other parts of the country and beyond. Table 3 below shows the percentage of firms involved in the market of various products and services.

Table 3: Percentage of firms involved in the market for various products and services

Product/Service	%	Product/Service	%
Laptop-new	64.1	Phones (GSM) – new	41.7
Retailing	61.5	Repairs and servicing of desktop	41
Laptop accessories	57.1	Repairs and servicing of laptop	40.4
Installation	56.4	Downloading	39.1
Cloning of computers	53.2	Marketing	39.1
Desktop-new	52.6	ICT solutions/Applications	37.2
Desktop accessories	47.4	Phones (GSM) – used	34.6
Desktop – used	46.2	Cyber café services	32.5
Wholesale	46.2	Non-ICT products – Shoes	25
Laptop – used	45.5	Non-ICT products – Clothes	23.1
Other ICT products (Ipad, tablets)	45.5	Non-ICT products - Food	17.9
Phone accessories	42.3	Other	8.3

Source: Author's field survey (2013)

The ICT industry also has firms such as Omatek, Zinox, Speedstar, and Brian technology making locally branded products. These companies are Original Equipment Manufacturers (OEM), but still face competition from foreign brands like Dell, Toshiba, which many consumers prefer. Omatek is itself not located within the cluster, while Speedstar and Brian technology are located in very close proximity to it. Zinox has an office (though not the headquarters) within the cluster itself. Other non-ICT related products like clothes, shoes, cooked food, and fruit are also sold in the cluster. Businesses that support and are present in and around the cluster include financial institutions (for example Zenith Bank, Skye Bank), and cargo companies (for example DHL, FedEx Corporation, TNT, AS, Global express, IMS, and Tranex). Indian (Zed Mobile) and Chinese (Techno) firms are also penetrating the market. Credit facilities from banks as well as other SMEs are also available in the cluster.[11]

The Computer Village has a large population of youth, with 68.7 percent of employees reportedly between 21 to 30 years of age. 7.8 percent are less than 20 while under a quarter (23.5 percent) are above 31. Survey results show a comparable mix of female (48.1 percent) and male (51.9 percent) employees. The cluster also has a large population of graduates, with close to 50

[11] A bank which gives a loan to established businesses (having shops), had an interest rate of between 27 percent to 30 percent, depending on the plan, up from 25 percent. And also a 2.5 percent one-off management fee.

percent being university graduates and almost 30 percent with technical degrees as seen in table 4 below. 19.1 percent reported having high school degrees while only 3 percent had attained only elementary school education. These results are corroborated by previous studies that found a significant number of skilled workers in the cluster who were trained in computer engineering, computer science, electronics, business administration and other related disciplines (SMEDAN, 2005; Oyelaran-Oyeyinka, 2007). In particular, SMEDAN (2005, p. 85) found "55 percent of respondents are university graduates, 15 percent are graduates of the polytechnic, 20 percent are technicians, while the rest 10 percent are the unskilled ordinary traders."

Table 4: Profile of Employees in Otigba

Characteristics of employees	Respondents	
I. Age group	No.	Percentage
< 20	12	7.8
21 - 25	57	37.3
26 - 30	48	31.4
31 +	36	23.5
Total	153	100.0
II. Sex		
Female	75	48.1
Male	81	51.9
Total	156	100.0
III. Educational attainment		
University Degree	64	48.9
Technical	39	29.8
High school	25	19.1
Elementary	3	2.3
Total	131	100.0
IV. Weekly income in Naira		
0-N1,000	27	17.3
1,001-5,000	29	18.6
5,001-10,000	33	21.2
10,001-50,000	44	28.2
Above 50,000	6	3.8
No Response	17	10.9
Total	156	100.0

Source: Author's field survey (2013)

According to SMEDAN (2005), CAPDAN had about 3,500 registered enterprises, with about 8,000 to 10,000 employees excluding their employers. There are also about 1,500 street operators. The cluster has thus served to employ a lot of people, including graduates. Informants agreed that the Computer Village helped to provide a source of employment and income for people, including graduates. One interviewee was categorical that in the unlikely event of closing

down the market, it will lead to unemployment, poverty, and insecurity. The secretary of CAPDAN stated in response to a newspaper interview question: "what significant role would you say the Computer Village is playing in the national economy" that

> The contribution from this cluster has been enormous… Computer village, I stand to be corrected, has done more than any other sector has done for this country… When you talk about employment and wealth creation here, it is amazing what impact this village has made on the economy. (National Mirror, 2012).

The cluster has shown a consistent pattern of profitability over time. Between 1999 and 2004, it saw an increase in profitability and output exported. In particular, profitability was recorded at approximately 40, 35, 37, 39, 42, and 44 percents between 1999 and 2004 (Oyelaran-Oyeyinka, 2007). In surveying the present worth of the firms, 11.6 percent of respondents each fell into the N0 – N50,000 and N50,000 – N100,000 categories.[12] The largest number of respondents (27.4 percent) indicated that their businesses were worth between N1,000,001 – N5,000,000, while 10.5 percent had businesses worth over a N100,000,000 (Author field survey, 2013).

The trade reach of the cluster extends beyond Lagos State, and even Nigeria. This is because the cluster has a large variety of customers including individual end-users, companies, and other retailers, nationals and foreigners for example Congo and South Africa, but most customers come from West Africa – Abidjan, Ghana, Sierra Leone, Togo. Furthermore, firms in the cluster obtain their inputs largely from within the cluster and ICT distribution centres, while others have established contacts with firms in countries of origin such as China, Malaysia, Dubai, the United Kingdom, the United States of America, Hungary, Mexico to purchase parts and intermediate products. One implication of this is that the price of the goods are significantly influenced by the exchange rate regime; showing the importance of macroeconomic policies on firms.

Presentation and Discussion of findings

The nature and quality of employment impacts, albeit differently, the income and non-income benefits received from a firm. Certainly, other factors besides income affect one's quality of life, standard of living, and wealth/poverty level, however, employment remains an important

[12] Exchange rate €1=N224.915, as at 29th of April, 2014. www.oanda.com; N0 – N50,000 = €0 – €222; N50,001 – N100,000 = €222 – €445 ; N1,000,001 – N5,000,000 = €4,446 – €22,231; N100,000,000 = €444,613

determinant (World Bank, 2013); however, the worker's income determines to a large extent the living standard including expenditures on both luxury items and basic necessities such as housing, sanitation, water, transportation and household assets. In this section therefore, statistical analysis based on data from the survey questionnaires is reported.

In order to situate analysis on the cluster within the broader national context, I first present multidimensional poverty indicators at the national level, showing results for both the urban (within which the cluster is located) and the rural areas, and compare it to select indicators from survey of the cluster. As figure 1 in the appendix shows, there are clearly significant differences between intensities of rural and urban poverty, with a greater percentage of households located in rural areas being far more severely deprived than those located in urban areas on almost all the indicators. Over-crowding is the only exception where more households (43.7 percent) were deprived in occupancy rate (persons living per room) in households located in urban areas than rural areas (42.4 percent). The results reflect the reality that poverty in rural areas is more prevalent than urban areas, while urban poverty is exacerbated by high intensity slum formation; the rural areas are less populated and have low population densities but lack the most basic amenities such as water, electricity and health care system.

In both urban and rural areas, "Years of schooling of women members" shows the highest level of deprivation at 97.5 percent (urban) and 98.5 percent (rural). Deprivation in water and sanitation facilities is however very high, greater than 80 percent and 90 percent in urban and rural areas respectively. The least deprivations is found in female nutrition (urban - 8 percent, rural – 9.9 percent). In comparing the national urban figures to available indicators for the cluster, we see that employees in the computer village are less deprived in sanitation, drinking water and assets. This could be because access to adequate sanitation and water, though deficient in Lagos, might be better than other urban areas. Furthermore, employees in the cluster might be able to afford and access certain assets like radio and television, at a cheaper rate to urban households where supply of these goods or the taste for it is not as high. However, compared to urban areas in Nigeria, *Otigba* employees tend to live in more crowded rooms, use more of kerosene or firewood as cooking fuel, and other means of lightening except electricity.

Standard of Living of Employees in the Cluster

In reporting the cluster findings, descriptive, as well as bi-variate analysis of both the subjective and standardized measures are reported. Survey results showed that 70 percent of employees indicated that working in their firms had increased their standard of living. Furthermore, and of great significance for this study, firms located in the cluster tended to have employees who reflected higher standard of living than those not located within the cluster. About 55.1 percent of employees who responded agreed that workers in computer village are faring better financially than those doing the same work outside of computer village. Although less than half (46.8 percent) admitted that workers in computer village are very satisfied, only 35.9 percent of respondents to the question indicated that most workers will go to work outside of computer village, given the opportunity. Thus subjective measures of living standards show that most employees perceive that they are doing better since working in the cluster.

Next, descriptive analysis show standardized measures of living standards among Otigba employees, using the standard of living indicators of the multidimensional indicators, and as well UN-Habitat's slum household indicators. In addition, these standardized or objective measurements are further broken and measured against the self-reported standard of living indicators. The self-reported standard of living indicator used is based on the response of employees' in comparison to their colleagues. In particular, the question, "How will you describe your current standard of living compared to your peers?" was asked. Five possible answers were given – poor, surviving, comfortable, rich and very rich. For ease of analysis, the five categories were contracted to three: poor = poor and surviving; comfortable; rich = rich and very rich. We analyze the different indicators in this order: energy use; drinking water; sanitation (access to toilet facilities); housing; and personal assets.

Energy Use: *Cooking Fuel and Electricity*

For this study, employees' responses on the cooking facility they use are grouped into three: modern fuel which includes electricity, LPG, natural gas and biogas; improved fuel which includes kerosene, coal, lignite and charcoal; and traditional fuel which consists of firewood, straw and dung. In the survey for this study, respondents tended to use first modern (46.8 percent), followed by improved (37.8 percent) and then traditional (9 percent) fuel sources to

cook[13]. However, while a larger proportion of the comfortable and the rich used modern fuels, the largest percentage (48.21 percent) of those who self-identified as poor tended to use improved fuel sources. Surprisingly, among those who used traditional cooking facilities, the rich made the largest percentage. The results support evidence that wealth affects the choice or access to basic amenities like cooking facilities that individuals and households use, and consequently, their standard of living.

In the same manner, in considering lighting used in the homes, lighting from main electricity i.e. from the public grid (36.5 percent), generators (19.9 percent) and kerosene (14.7 percent) were the largest three categories used by employees in the cluster. Taking a close look at the self-reported living standard categories, we find that the poor and comfortable indicate that main electricity is their main source of lighting. However, it is possible that the electricity that is received is not frequent. Indeed, survey (Lagos Bureau of Statistics, LBS, 2011) shows that in Lagos 97 percent of respondents got their power supply from the federal agency in charge of electricity – the Power Holding Company of Nigeria (PHCN), while 3 percent got from other sources. However in considering the frequency of unexpected interruptions, up to 90 percent of the households experienced daily interruptions. Similarly, in terms of the frequency of electrical provision per day, only 4 percent and 1 percent of respondents had between 11 to 15 hours and 21 to 24 hours of electricity each day.[14] For cluster employees, less than 20 percent (18.6 percent) receive power supply all the time. 34 percent receive it a few hours a week, 24.4 percent a few times a week, 9 percent once a week, and 9 percent once a month.

Not surprisingly, among the rich in the survey, the largest percentage of respondents receive their main source of lighting from electrical generator (see table 5 below). Evidently, this means is expensive, and causes a lot of air and sound pollution, however, for both companies and individuals, given the failure of public services, individuals resort to private provision of these amenities. In light of the expenses associated with maintaining and fuelling electrical generator,

[13] Where reported percentages do not add up to 100% as in this case, the missing numbers represent missing values i.e. from non-respondents.

[14] 16 percent of households in Lagos claimed to receive less than one hour of power supply each day, 55 percent received between 1 to 5 hours, 19 percent between 6 to 10 hours, and 5 percent between 16 to 20 hours.

and the inadequacies of publicly generated electricity, some respondents resort to the use of kerosene, gas and candles.

Table 5: Association of Standards of Living and Main Source of Lighting

Living standards →	Poor		Comfortable		Rich		Total
	No.	%	No.	%	No.	%	No.
Source of lightening							
Kerosene	12	54.55	4	18.18	6	27.27	22
Gas	5	38.46	8	61.54			13
Main Electricity	16	32.00	31	62.00	3	6.00	50
Electricity from generator	4	12.90	11	35.48	16	51.61	31
Candles	8	44.44	7	38.89	3	16.67	18
Firewood	1	50.00	1	50.00			2
Other					1	100.00	1
Total	46	33.58	62	45.26	29	21.17	137

Data source: Author's field survey (2013); *Note:* Chi-square= 42.465, Sig.= 0.000

Drinking Water

In this study, drinking water can be gotten from improved or non-improved sources. Improved drinking water sources include piped water into dwelling, plot, or yard; public tap/standpipe; tubewell/borehole; protected dug well; protected spring and rainwater collection. Unimproved drinking water sources include unprotected dug well; unprotected spring; cart with small tank/drum; bottled water;[15] tanker-truck and surface water (river, dam, lake, pond, stream, canal, irrigation channels) (WHO & UNICEF, 2006).

Survey results show that a significant percentage of Otigba employees have access to improved drinking water sources. In particular, 53.8 percent use water that was piped into dwelling, piped into compound/plot, bottle water, and public tap, 32.1 percent used open well in yard/plot, open public well, protected well in dwelling, protected well in yard/plot, protected public well and 8.3 percent got their drinking water from river, stream, pond, lake, rainwater, satchel, and tanker truck. This result could be reflective of most of the respondents living in Lagos which itself has a lower percentage of people using unimproved drinking sources, with the exception of sachet water (15.9 percent). Unfortunately, there are those who seek to benefit from deplorable and scarce water situations and when "municipal authorities do attempt to extend water supply to

[15] Bottled water is considered improved only when the household uses water from an improved source for cooking and personal hygiene

poorer neighbourhoods they are often met with violence and intimidation from water tanker lobbies, "area boys" and other groups who benefit from the unequal distribution of water and the "micro-circuits" of exploitation which characterize slum life" (Gandy, 2006, p. 12-13).

Looking more closely at Lagos, in the 2011 Lagos state household survey, among the sampled households, it was found that more than half of respondents (57 percent) got their water from the borehole. Other sources of water were as follows: 8 percent - piped water into dwelling, 3 percent - piped water to yard/plot, 4 percent - public tap/stand pipe, 10 percent - protected dug well, 3 percent - unprotected dug well, 13 percent - small scale vendor and 2 percent - tanker truck (LBS, 2011, p.144). However, only 34 percent of households attested to treating their water to make it safer before drinking it (ibid, p. 153).[16]

In comparing the perception of respondent's living standard and their source of drinking water, the largest percentage of those classified in the poor (36.71 percent) and comfortable (55.70 percent) living standard categories were in the 1st category i.e. piped into dwelling, piped into compound/plot, bottle water, and public tap, while the largest percentage of the rich (40.91 percent) were in the second, which is largely equally good category i.e. open well in yard/plot, open public well, protected well in dwelling, protected well in yard/plot, and protected public well. Overall, there is conclusive evidence that those who work in the cluster and the ICT sector have good access to improved drinking water.

Table 6: Association between standards of living and source of drinking water

Living standards →	**Poor**		**Comfortable**		**Rich**		**Total**
Source of water	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**
Piped into dwelling, Piped into compound/plot, bottle water, and public tap	29	36.71	44	55.70	6	7.59	79
Open well in yard/plot, Open public well, Protected well in	16	36.36	10	22.73	18	40.91	44

[16] Respondents added bleach/chlorine - 23 percent, boiled it - 25 percent, let it stand and settle - 27 percent or used ceramic, sand or composite water filters - 24 percent (LBS, 2011, p. 153).

dwelling, Protected well in yard/plot, and Protected public well							
River, Stream, Pond, Lake, Rainwater, Satchel, and Tanker truck	3	23.08	5	38.46	5	38.46	13
Total	48	35.29	59	43.38	29	21.32	136

Data source: Author's field survey (2013); *Note:* Chi-square= 24.458, Sig.=0.000

Sanitation

Sanitation is here measured by access to toilet facilities. This indicator has been grouped into three categories, namely: Flush, Improved, and no facilities. Improved facilities consists of traditional pit, ventilated improved pit, and latrine while people using bush, field, bucket, and pan for toilets are grouped as having no facilities. Survey results show that 56.4 percent of employees use flush toilets at home, followed by improved (21.2 percent) facilities. 16.7 percent do not have no toilet facilities at home. It is found too that the relationship between standard of living and access to toilet facilities is highly significant (see table 6). The highest percentage of respondents across all categories are using flush toilets. In particular the largest percentage of poor (33.75 percent) and comfortable (57.50 percent) respondents are to be found in this category, while the biggest percentage of the rich (40.63 percent) use other improved sources. About 17.64 percent of all respondents however have no facilities, with the poor (41.67 percent) making the largest percentage of this category, surprisingly followed by the rich (37.50 percent). The percentage of those with no facilities on the national level is 28.2 percent, while that for urban areas is 18.1 percent (Harmonized Nigeria Living Standards Survey, 2009).

Table 7: Association of Standards of Living and Access to Toilet

Living standards →	**Poor**		**Comfortable**		**Rich**		**Total**
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**
Source of sanitation							
Flush	27	33.75	46	57.50	7	8.75	80
Traditional pit, ventilated improved pit, and latrine	10	31.25	9	28.13	13	40.63	32
Bush, field, bucket and pan for toilets	10	41.67	5	20.83	9	37.50	24
Total	47	34.56	60	44.12	29	21.32	136

Data source: Author's field survey (2013); *Note:* Chi-square= 22.987, Sig.=0.000

In Lagos (LBS, 2011), many of the respondents indicated using flush toilets, albeit flushed to different places: to tank (54 percent), pour to pit (27 percent); pour to street, yard, ditch (13 percent) and covered pit latrine (6 percent). 51 percent have their toilet facilities inside the house, while 49 percent and 1 percent respectively have it outside the house on plot, and outside the plot/public toilet.

Assets

Survey results also show a significant relationship between change in personal assets and the living standards of workers. Cluster employees own a wide variety of assets from radios to cars, nevertheless most seem to possess the least expensive and less the more expensive ones. Particularly, the largest number of respondents had radios (74.4 percent), then television (70.5 percent), computer (64.7 percent), refrigerator (62.2 percent), generator (55.8 percent) and car (34 percent).

However, working in a firm in the cluster seems to have generally improved the possession of these personal assets. The poor and comfortable in particular have a greater percentage who attest to this improvement as opposed to the rich who might have had these assets before working within the cluster.

Table 8: Association of Standards of Living and Change in Possession of Personal Assets

Living standards →	**Poor**		**Comfortable**		**Rich**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Change in assets								
Yes	28	32.18	48	55.17	11	12.64	87	100.00
No	12	37.50	4	12.50	16	50.00	32	100.00
Total	40	33.61	52	43.70	27	22.69	119	100.00

Data source: Author's field survey (2013); *Note:* Chi-square= 24.335, Sig.=0.000

Housing/Sufficient living area

Information on employees' home conditions were collected. In the cluster, more than a quarter (26.3 percent) of the employees who responded lived in houses where more than 3 people share a bedroom; an indicator of insufficient living condition by the UN-Habitat. More generally, as seen in table 9 below more than half live in houses which are in need of major repairs, while

more than a quarter have houses located in a hazardous place, on or near a toxic waste, in a flood plain or on a steep plane.

Table 9: Opinion of Employees about Dwelling Units

Opinion on dwelling units	Respondents with affirmative response	
	No.	Percentage
The dwelling is in need of major repair	83	53.2
The location of the house is in a hazardous place	49	31.4
The dwelling is located on or near toxic waste	49	31.4
The dwelling is located in a flood plain	44	28.2
The dwelling is located on a steep slope	48	30.8
The dwelling is located in a dangerous right of way (e.g. close to rail, highway, airport, power lines)	37	23.7
More than three people share each bedroom	41	26.3

Data source: Author's field survey (2013)

Currently, in Nigeria there is a significant dearth of affordable, decent, and safe dwellings (Ademiluyi, 2010). As at 2013, the figure had risen to a deficit of 16 million housing units, with Lagos having 5 million, or 30 percent of the country's shortage according to the state's commissioner for housing (Uroko, 2013). Survey results from the Lagos Bureau of Statistics (2011) show that about 73 percent of households live in an average of 1 to 2 rooms, 21 percent occupy 3 to 4 rooms while 1 percent occupy an average of 5 to 6 rooms. Evidently the supply constraints in the housing sector equally impacts the workers of Otigba given that the cluster is located in Lagos, a state with a significantly high housing shortage.

In considering the housing material used in the houses respondents stay, there are three main categories namely: natural, rudimentary, and finished. Natural material consists of earth, sand, and mud, while coarse wood planks, palm/bamboo, and unpolished cement are classified as rudimentary material. Finished material encompass parquet or polished wood, marble, linoleum, ceramic tiles, cement (polished), carpet, and terrazzo material. Among respondents in this study, 19.01 percent used natural, 38.84 percent rudimentary and 42.15 percent used finished materials for their homes. While the results of analysis associating type of housing material with respondents standard of living is not significant (sig. = 0.761), it is still worth mentioning that the largest percentage of the poor (45 percent), and rich (42.86 percent) live in accommodation made

of rudimentary materials. On the other hand, the comfortable have their largest percentage (47.17 percent) living in houses using finished materials.

Table 10 below shows the summary of the standardized measures of living standard among Otigba employees and how they fare compared to the national urban averages. On most indicators – cooking fuel, drinking water, sanitation and assets (except cars), a larger percentage of employees are using/ have access to the more improved sources. Sometimes, this percentage is even greater than half e.g. for drinking water, sanitation and all assets (except cars). For housing as well, apart from the situation where more than half live in houses which require major repairs, across the other indicators, approximately 68 percent do not fall under the other less desirable housing location conditions.

Table 10: Summary - standardized measures of living standard among Otigba employees

Multidimensional/Slum Household Indicators	**Cluster Employees' Living Standard**
Compared to urban areas in Nigeria	Otigba employees fare better in sanitation, drinking water and assets than national urban averages but tend to live in more crowded rooms, use more of kerosene or firewood as cooking fuel, and other means of lightening except electricity
Cooking fuel	Largest percentage (46.8 percent) use modern fuel sources i.e. electricity, LPG, natural gas, and biogas
Electricity	Largest percentage (36.5 percent) use electricity from the public grid; however power supply can be irregular
Drinking water	Largest percentage (53.8 percent) using improved drinking water sources
Sanitation - Access to toilet facilities	Largest percentage (56.4 percent) use "flush" toilets at home
Assets	More than half of the respondents have all personal assets, apart from cars (34 percent): radio (74.4 percent), television (70.5 percent), computer (64.7 percent), refrigerator (62.2 percent), generator (55.8 percent)
Housing	More than half live in houses which are in need of major repairs (53.2 percent), while more than a quarter have houses located in a hazardous place (31.4 percent), on or near a toxic waste (31.4 percent), in a flood plain (28.2 percent) or on a steep slope (30.8 percent) The largest percentage (47.17 percent) lived in houses made of finished material (encompass parquet or polished wood, marble, linoleum, ceramic tiles, cement (polished), carpet, and terrazzo material)

Data source: Author's field survey (2013)

In summarizing the subjective versus standardized measures of living standards, results show that self-reported poor tend to fare less than the rich on most indicators. However, the poor and the rich tend to have used similar housing materials to build their homes. The comfortable tend

to have some overlay with the poor (choice of lighting, source of drinking water, and access to toilet facilities), and the rich (cooking fuel). However, the rich are better able to make more 'luxurious' choices in terms of type of cooking facilities, lighting, and transportation used. The table 11 below shows the different assets, and as well the categories in which the largest number of each of the various groups – poor, comfortable, and rich – were found.

Table 11: Subjective vs. standardized measures of living standards in cluster

		Poor	Comfortable	Rich
Housing	Type of housing material used; Chi-square = 1.860 Sig = 0.761	Rudimentary	Finished	Rudimentary
Water	Source of drinking water; Chi-square = 24.458 Sig. = 0.000	Piped into dwelling, Piped into compound/plot, bottle water, and public tap	Piped into dwelling, Piped into compound/plot, bottle water, and public tap	Open well in yard/plot, Open public well, Protected well in dwelling, Protected well in yard/plot, and Protected public well
Sanitation	Access to toilet facilities; Chi-square = 22.987 Sig. = 0.000	Flush	Flush	Improved
Energy	Cooking fuel; Chi-square = 18.972 Sig. = 0.001 Lighting; Chi-square = 42.465 Sig. = 0.000	Improved: kerosene, coal, lignite & charcoal Main electricity[17]	Modern: electricity, LPG, natural gas, biogas Main electricity	Modern: electricity, LPG, natural gas, biogas Electricity from generator
Assets	Change in assets; Chi-square = 24.336 Sig. = 0.000	Yes	Yes	No

Data source: Author's survey (2013)

Conclusion, Implications for Policy and Areas for Future Research

This paper has attempted to accomplish the following. Firstly, it has drawn on theory to highlight why manufacturing might be a basis for economic growth and development; articulating the rationale for industrialization as a pathway to economic growth. Next, it provided arguments as to the link between clusters as a unique form of industrial organization and poverty alleviation. Third, the paper provided evidence from survey carried out in the Otigba Information and

[17] The most used energy sources indicated after main electricity by the poor were kerosene and candle; while the comfortable used electricity from generator and gas

Communications Technologies cluster to understand the living standards of the workers, both subjectively (based on the perceptions of the workers), and using standardized indicators (guided by the multidimensional poverty and slum household indicators).

Overall, the findings of this study provide strong evidence to support literature on the benefits of firm agglomeration in a developing country setting, not only in improving firm-level productivity, but also for achieving poverty reduction objectives; poverty measured within a multidimensional frame and as evidenced by an improvement in living standards. Indeed, 70 percent of those in the cluster indicated that working in the firms had improved their standard of living, while more than half of the employees were using improved water and sanitation facilities. A greater percentage were not inhabiting houses that were in precarious locations while more than half possessed all assets (except cars) including radio, television, computer, refrigerator, and generator. Furthermore, self-reported and standardized indicators tended to corroborate each other as self-reported poor tended to fare less than the self-reported rich on most of the standardized indicators. This study's stance lines up with that of Otsuka and Sonobe (2011) in that, government – working towards the goal of employment creation, increased productivity and poverty reduction – should spearhead the development of clusters, provide support services for self-started clusters and acknowledge their contribution to national productivity by including cluster-related infrastructure in development plans.

However, while we recognize that employment in clusters could influence the living standards (as per MPI indicators) of cluster employees, there are other determinants of individual standard of living choices such as household income, number of dependants inter alia – which were not within the purview of this research. Furthermore, the study did not take account of pre-existing income and standard of living conditions, but used their working at the particular firm within the cluster to ask about the improvement in their living standards. These can be seen as limitations of the study. That said, the methodology employed by this study is a significant contribution to the empirical literature on industrial clustering and poverty alleviation. Going forward, this methodology could be applied to study living standards in other productive as well as non-productive industrial clusters in Nigeria and across Africa. A similar study on non -productive industrial clusters can serve to contribute evidence-based strategies for improving cluster

efficency and contribution to economic growth. In addition to evaluating the living standards of employees in the various clusters, further studies can compute the multidimensional poverty indicator for each cluster, taking a cue from a study by Ataguba, Fonta and Ichoku (2012) which computed MPI for a rural community in South-Eastern, Nigeria.

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