The role of subcontracting on innovation: an assessment of small and medium enterprises in Nigeria

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ABSTRACT
This paper investigated the influence of subcontracting on innovation and its impact on the performance of small and medium enterprises (SMEs) in Onitsha, Nigeria. The paper adopted a number of methods comprising of field observations, reference to relevant literature, and a questionnaire survey of 113 SMEs. Regression, mean and standard deviation were used to analyse the data. In line with the literature, this paper identified seven (7) dimensions of subcontracting assistance from large scale industries to small business firms. The paper found that subcontracting relationship between large scale industries and SMEs is inclined to production and product-related cooperation where the contractors are concerned with meeting fluctuation in demand and shortening long delivery times. This paper concluded by suggesting that subcontracting relationship between SMEs and large scale industries should not be restricted to production, purchase, finance and marketing assistance. It should also be extended to human resource development and organisational-know-how.

1. Introduction
The relationship between the large-scale firms and small and medium enterprises has given rise to innovation opportunities. Innovative activities may be hard to appropriate if they are not performed by specialised firms with the appropriate skills and capacity. Consequently, subcontracting is on the rise following the increase in inter-sector technological specialization and buyer-supplier relations which have become more effective vehicles for exchanging technological know-how today (Dyer & Nobeoka, 2000; Dyer & Singh, 1998). Today, large-scale industries increasingly use cooperative relations with the outside supplier (small and medium enterprises) to obtain technology in core areas of production. This relational view perspective (Dyer & Singh, 1998) establishes that much of a firm’s innovation now occurs in conjunction with outside suppliers rather than inside the firm. This new model of inter-organizational relations as a means to innovation is superseding traditional in-house development (Mol, 2005). For instance, Mazzanti, Montresor, and Pini (2006) showed that in the district-like context analyzed, the firms’ innovativeness correlates positively with the complexity of

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the outsourcing which requires the subcontracting of ancillary activities in order to refocus on the business core. This cooperative relationship between firms can lead to a product, process, marketing and organizational innovation. These forms of innovations are achieved by a firm’s ability to concentrate on its core competencies while relying on others firms to perform their non-core or peripheral production functions.

In Nigeria, large-scale industries have been exposed to intense competition due to the accelerated process of globalization. This brings out the need for SMEs to develop competitiveness in order to cooperate with large-scale industries. Small-scale enterprises or firms are business that employs a small number of workers and does not have a high volume of sales (Ali, Mumtaz, Akhtar, & Ullah, 2014). These enterprises are generally owned by private individuals and sole proprietorships. These business firms, in general, are constrained by resources such as technology, finance, marketing, and human resources (Kafigi, 2015). The ability of these firms to compete in the global market depends on their access to these resources and firms that have better access to these resources are able to exhibit better innovative and economic performance (Atalaya, Anafarta, & Sarvanc, 2013; Ivarsson & Alvstam, 2004; Kumar & Subrahmanya, 2010). Subcontracting relationships between large-scale industries and SMEs provides SMEs with better scope for innovation and accessing these resources. The aim of this paper, therefore, is to assess the degree of subcontracting assistance from large-scale industries and it impact on innovation and performance of SMEs in Nigeria. The paper is structured as follows: introduction, conceptual framework and literature review, material and method, result, the implication of study and conclusion.

1.1. Conceptual framework and literature review

Innovation is the process of making changes, large and small, radical and incremental, to products, processes, and services that result in the introduction of something new for the organization that adds value to customers and contributes to the knowledge store of the organization (OECD, 2015 cited in Ndesaulwal & Kikula, 2016). Many scholars have written widely on the concept of innovation. Despite the recognition that firms have specific types of innovation objectives, there is a concentration of the innovation literature on product innovation to the extent that the existing literature has almost neglected other important strategies or objectives which also develop and sustains firms competitive advantage such as process, marketing and organizational innovation (European Commission, 2008; Niehaves, 2010; OECD, 2005, 2015; Reichstein & Salter, 2006). Product innovation is a component of competitiveness, embedded in the organizational structure, processes, products, operations, and services within a firm (Gunday, Kandah, & Ranch, 2011). It is one of the fundamental instruments of growth strategies to create new markets, increase the existing market share and to provide the firm with a competitive edge (Ibidunni, Iyiola, & Ibidunni, 2014). Process innovation, on the other hand, is the development of new products, making changes in the current product design or using new technology in the introduction of new elements into a firm’s production or service operation (Amesse, Dragoste, Nollet, & Ponce, 2001; Rainey, 2006). This is to produce a product or render a service with the aim of improving productivity, capacity, flexibility, quality, cost reduction, rationalizing production processes, and lowering labour costs (Edquist, 2001; Hatonen & Eriksson,
Similarly, while marketing innovation is the production and implementation of new marketing methods which involves changes in the product design, packaging, product placement, product promotion and pricing (Hall, Moncada-Paterno-Castello, Montresor, & Vezzani, 2016; OECD, 2005), Organizational innovation is the creation or adoption of an idea or behaviour new to the organization. Hence, innovation is intrinsically about identifying and using opportunities to create new products, services or work processes. Innovation in this paper will be analysed from the point of product, process, marketing, and organizational innovation.

The concept of subcontracting, on the other hand, has been defined as an economic relationship where one entity (the main contractor) requests another independent entity (the subcontractor) to undertake the production of parts, components, sub-assemblies or the provision of additional services that are necessary for the completion of a final product. (Manez, Perez-Lopez, Prior, & Zafra-Gomez, 2016; UNIDO, 2003). The concept of subcontracting suggests that on the account of the common problems firms all share, SMEs are in the best position to help each other (Ceglie & Dini, 1999; Ceglie & Stancher, 2009; Chiang, 2009). They can do this through horizontal cooperation (they can collectively achieve economies of scale), vertical cooperation (they can specialize in their core activities and develop the external division of labour), and networking among enterprises. This help firms to spread risks, open new market, create new source of supply, reduce costs and gain access to key technologies (Holl, 2008; Nwokocha & Madu, 2015; Nwokocha, Madu, Ocheje, & Olerum, 2015a; Nwokocha, Madu, Ocheje, Olerum, & Nwosu, 2015b; Pihkala, Varamaki, & Vesalainen, 1999).

Subcontracting relationship between large-scale industries and SMEs involves the production of intermediate parts, components, and services by the later for the former. In this process, there is scope for the transfer of a variety of assistance from a contractor to subcontractors, which can enable subcontracting SMEs to harness their potential to undertake innovations, which in turn would contribute to the enhancement of their performance (UNCTAD, 2001). Furthermore, Bartel, Lach, and Sicherman (2009) in their study of Spanish manufacturing firms between 1990 and 2002 found that subcontracting does increase technological change. The study found that expectation with regard to technological change in production process is a significant explanatory variable of the probability of subcontracting production. Similarly, Görg and Hanley (2007) cited in Alderete (2013) found a positive effects between subcontracting and innovation in international subcontracting activity at the level of the individual establishment. These positive effects stems from the level of cooperation that exists between firms in the area of product, production process, organizational know-how and marketing.

In Nigeria, it has been found that in high environmental uncertainty and volatility, subcontracting is an avenue for creating a shared resource pool capable of increasing the capacities of the SMEs (Abdullahi, 2014; Ogbari, Ajagbe, Isiavwe, and Ade-Turton, 2015). Subcontracting has also been attributed to resource accessibility (Ajayi, 2007; Arimah, 2002), firm’s competitiveness (Alarape, 2007), and firm performance (Nwokocha & Madu, 2015). These findings have shown that subcontracting is an important strategy used by SMEs to achieve risk reduction, cost reduction, resources accessibility, and competitiveness. These findings, however, failed to show the level of assistance received by SMEs from large-scale industries through...
subcontracting and whether these areas of assistance aid innovation in small business firms. This is on the basis that subcontracting firms (SMEs) receive assistance from the contractor (large-scale industries) and the degree of inter-firm linkages between the participating firms have to be assessed in terms of the assistance provided by the contractor to the subcontractor (Kumar & Subrahmanya, 2010).

Consequently, this paper adopted the seven degrees of subcontracting assistance between large-scale industries and the small business firm of Kumar and Subrahmanya (2010) and UNCTAD (2001). These degrees of subcontracting assistance are product, production process, organization know-how, marketing, human resources, financial, and purchase process (Ivarsson & Alvstam, 2004; Kumar & Subrahmanya, 2010; UNCTAD, 2001; Wattanapruittipaisan, 2002).

1. Product-related: Exposure to high-quality sophisticated products demanded by large-scale industries benefit the local small-scale industries in improving their product development capabilities. Provision of detailed specifications and designs of the product, feedback on product performance and quality for improvement and proprietary technology for products by large-scale industries enable SMEs to develop technical capabilities that make them more competitive in product-related technology (Ivarsson & Alvstam, 2004; Kumar & Subrahmanya, 2010; UNCTAD, 2001).

2. Production process related assistance: Large-scale industries can be one of the major sources for local SMEs to learn new manufacturing practices of international quality standards. Large-scale industries can provide machinery and equipments as well as raw materials which SMEs have limited access to. Moreover, large-scale industries can provide advice on raw material procurement, selection of machinery and equipments and the special production process to be used so as to enable SMEs to enhance their production capabilities (Ivarsson & Alvstam, 2004; Kumar & Subrahmanya, 2010; UNCTAD, 2001).

3. Organizational know-how: Small scale firms do not have access to modern management techniques for manufacturing, and they generally have insufficient resources to invest in such management practices. Large-scale firms that follow superior modern management practices can pass on this knowledge to their small scale firm suppliers. Organizational know-how here involves provision of advice on inventory management, quality control techniques and layout planning as well as human resource management. These variables enhance the organizational know-how of supplier small scale firms with important positive effects on supplier performance (Ivarsson & Alvstam, 2004; Kumar & Subrahmanya, 2010; UNCTAD, 2001).

4. Marketing: Small business firms, unlike large-scale industries, are constrained in the area of marketing. This is because of the absence of a functional department in the area of product/services publicity, advertisement and marketing. SMEs are usually constrained by finances to set-up and run such departments and as a result, find it difficult to market their products/services themselves. Consequently, large-scale industries provide assistance to SMEs by providing an already made market for their products. Therefore, the amount of goods and services procured by large-scale industries from the SMEs as well as the amount of sales they obtained through recommendation by the large-scale industries to other customers are indicators of the marketing assistance provided by the large-scale industries (Kumar & Subrahmanya, 2010).
5. Human resource: SMEs need to upgrade their labour skills for their survival and growth in the era of global competition. But SMEs in general, are constrained by a lack of resources for training their labour force and should utilize the opportunities from external sources for upgrading their labour skills. Inter-firm networking in the area of human resource development, therefore, is vital in linkages, and expands the scope for deeper spill-over’s of skills and knowledge. Large-scale industries that provide training to their labour force of suppliers and practice swapping of personnel with the suppliers can be a major source of external assistance for labour skill upgrading (Kumar & Subrahmanya, 2010; UNCTAD, 2001).

6. Financial: Adequate finance for development as well as for day to day operations is another major problem faced by SMEs of developing countries. SMEs due to their size rely on external sources such as the large scale industries for their financial requirements. Large-scale industry customers provide assistance by extending financial support for the operational requirements of SMEs in addition to other forms of financial schemes provided by government institutions (Kumar & Subrahmanya, 2010; UNCTAD, 2001).

7. Purchase process: One of the crucial elements of subcontracting relationship between large-scale industries and SMEs is the implementation of the purchase process. According to Kumar and Subrahmanya (2010), one of the fundamental aspects of subcontracting relationship is the execution of the purchase – supply contract, which is agreed upon by both parties after negotiations. Key elements of the purchase process were identified as the advance information about future orders so as to enable SMEs to plan their production schedule to meet the delivery requirements, preferential pricing for the SMEs products/services and the proper and timely payments as to the contract. One of the ways in which SMEs can profit from subcontracting relationship with large-scale industries is regular receipt of payment.

SMEs will have to enhance their competitiveness in order to survive and grow in the context of global competition. But they are constrained by their poor access to critical infrastructural resources and one of their main external sources for these resources is the subcontracting relationship with large-scale enterprises. Subcontracting relationship with large scale enterprises provides SMEs better scope for receiving the assistance related to product, production process, organizational know-how, marketing, human resources, financial and/or purchase process, which in turn will enhance innovations of SMEs leading to their better economic performance.

Performance of firms, on the other hand, is a relevant construct in strategic management research. There is hardly a consensus about the concept’s dimensionality, measurement or what limits advances in research and understanding of the concept (Santos & Brito, 2012). Many studies measure firm performance with a single indicator and represent this concept as one-dimensional, even while admitting its multidimensionality (Glick, Washburn, & Miller, 2005). In the event of several dimensions, a researcher should choose the dimensions most relevant to his or her research and judge the outcome of this choice (Richard et al., 2009). Consequent upon this, this paper proposes to use a multidimensional measurement model of firm performance, structured in the Goal-Setting Theory (Locke & Latham, 2002). Goal-setting theory refers to the effect of setting goals to achieve performance. The theory emphasizes the important relationship between goals and performance. It holds that the most effective performance seems to
result when goals are specific and challenging, as well as when they are used to evaluate performance and linked to feedback on results, create commitment and acceptance (Lunenburg, 2011). Multidimensional model, on the other hand, is examined using a combination of both financial and non-financial indicators which lead to a balanced of performance measurement. The financial indicators are: sales growth, growth in profits, changes in assets by gross value plant and machinery, return on assets to measure capital efficiency. The non-financial indicators are: growth in market share; product success; increase in number of employees and labour productivity (Gakure, Kimemia, & Waititu, 2014; Hu, Zheng, & Wang, 2011; Kongmanilaa & Takahashib, 2009; Marimuthu, Arokiasamy, & Ismail, 2009; Nwokocha & Madu, 2015; Ongonga & Abeka, 2011; Tuan & Yoshi, 2010). This was used by this paper to probe whether innovations of SMEs contributed to their performance in Nigeria. Given the background, this paper is structured to answer the following questions in the context of SMEs in Nigeria:

1) what degree of subcontracting assistance do SMEs receive from large-scale industries?
2) what are the impacts of this assistance on innovation and performance of SMEs?

These questions would be answered based on the dualistic theoretical approach to subcontracting. Dualistic approach to subcontracting unlike the other approaches (development approach and networking and clustering approach), sufficiently dealt with the relationship between large-scale industries and SMEs and therefore appears most suitable for this study. This theory is based on the concept of ‘dualistic economy’, which includes two different sets of enterprises, the large-scale industries (multinational corporations), and small firms (Kongmanilaa & Takahashib, 2009). The basic understanding of this theory is that large contractors realize a benefit by using small contractors. There are two main reasons why a large firm prefers to subcontract production process through subcontractors. One of the main benefits is to enjoy flexibility by utilizing production capacity of subcontractors (Holmes, 1986; Watanabe, 1971). The second main benefit of subcontracting for large-scale industries is related to cost reduction (Oyeyinka, 2005; Gachengo & Kyalo, 2015). The large-scale industries may seek to subcontract production, particularly for unskilled-labour intensive production and to take advantage of lower wages in small firms (Holmes, 1986; Watanabe, 1971).

However, subcontractors which are usually SMEs are placed in an asymmetric relationship under the guidance of large-scale industries that know the specification in detail. This interpretation does not imply that there is no room for knowledge creation or innovation, but these activities take place as a by-product of the division of labour (Cohendet & Llerena, 2005; Williamson, 1999). By opposition, the knowledge-based economy conceives subcontracting relationships in a new fashion (Amesse & Cohendet, 2001; Amesse et al., 2001; Baudry, 2004; Cohendet & Llerena, 2005; Takeishi, 2002). Subcontractors are seen as suppliers endowed with both innovation and absorptive capabilities. It is the potentials of subcontracting partnership which is urgently sought for in this relationship. In this perspective, innovation opportunities become
strategic components resulting from the combination of know-how between the contractor and the subcontractors.

Consequently, this paper was based on the dualistic approach to subcontracting. This is because the subcontracting arrangement gives both industries the opportunity to work and benefit from each other. While the large-scale industries rely on the SMEs for completion of certain production tasks, the SMEs rely on the large-scale industries for assistance.

2. Methods and data

This study took place in Onitsha, Anambra State, Nigeria. Onitsha is one of the prominent commercial hubs of Nigeria and it is approximately 100 km from the state capital, Akwa. The area is located geographically between Latitude 06° 04.58″ N and Latitude 06° 10.00″ N of the Equator and Longitude 06° 44.59″ E and longitude 06° 48.52″ E of the Greenwich Meridian as was indicated in Figure 1. The city is currently attracting extensive industrial activities. These industrial activities can be seen in the establishment of various small, medium and large-scale industries in and around the city.

The study adopted a number of methods comprising of semi-structured interviews, field observations, a reference to relevant literature, and a questionnaire survey of small business firms. The empirical basis of the project was generated using information from the industrial directory of Manufacturers Association of Nigeria Anambra State (2014), which contains about 550 SMEs from five industrial sectors. Using a stratified random sampling method, 220 SMEs were randomly selected from these sectors. The variables studied in this paper are seven (7) degrees of subcontracting assistance-marketing, human resources, finance, purchase, product, organizational know-how and

Figure 1. Onitsha Anambra State Nigeria.
Source: Department of Geography University of Nigeria Nsukka
production – from large-scale to SMEs and the financial and non-financial measurement items – growth in sales, growth in profit, gross value of capital, return on asset, growth in market share, product success, labour productivity and increase in workers-of-firm performance as were discussed in the literature.

2.1. Analysis of respondents

Out of the 220 administered questionnaires, 113 (One hundred and thirteen) questionnaires were considered valid, with no missing data. This response rate from our observation was due to the unwillingness of the small business managers (respondents) to partake in the research. Most of the respondents were afraid that their information was unsecure in the hands of the researchers and could be used against them by their competitors. All efforts to put away these fears proved abortive. In view of this, the paper worked with 113 SMEs from five industrial groups as was shown in Table 1.

The population of the study comprised of 113 managers of the SMEs studied in the paper. The targeted SMEs were aged 20 years and 35 years and above for the managers on the average. About 80% of the SMEs were managed by men. The preliminary findings showed that 60.4% of the respondents had attained Secondary level of education while 30.6% had attained product-related skills training through apprenticeship and learning on the job, while 9% had attained the tertiary level of education. The low percentage in the tertiary level of education means that only a few number of managers have attained a diploma, high diploma, degree or a higher degree qualification. This could account for the unwillingness to partake in this research by some of the firm owners. This is because literacy or level of education is a vital element in research.

A trend analysis of these 113 SMEs was carried out in terms of their commencement during the period of 1990–2010. These periods were selected because they marked the beginning of industrial revolution in the Nigeria industrial sector (Ajayi, 1998, 2002). The early 90s saw an aggressive push in the setting up of industries for capacity utilization through the structural adjustment programme. For instance, capacity utilization, which was 30% at the end of 1986, increased to 36.7% by mid-1987 and further to 40.3% in 1990 and 42.0% in 1991 (Ajayi, 2007; Obokoh, 2008). Similarly, the late 2000s saw the emergence of industrial policies which were anchored on the development of the micro, small and medium scale enterprises. Some of these policies include small and medium industries equity investment scheme, National empowerment and development strategy etc. From the trend analysis, it was noted that while 10% of the firm units started between 1990 and 1993, 20% started between 1994 and 1996 periods. Similarly, while 12% of the firm units came into existence between 1997 and 1999, 28% took off between 2000

| Industrial Group/Sectors                  | Number of SMEs |
|-------------------------------------------|----------------|
| Paint and Allied products                 | 33             |
| Plastics, Rubber and Form                 | 22             |
| Fabricated Metal Products                 | 25             |
| Food and Beverage Products               | 19             |
| Information/data management              | 14             |
| Total                                     | 113            |

Table 1. Percentage distribution of sampled SMEs.

Author’s Computation
and 2005 while another 30% started operations between 2006 and 2010. The phenomenal increase of 20%, 28%, and 30% between 1994/96, 2000/05 and 2006/10 periods can be attributed to the emphasis on the development of small scale sector predicated on the structural adjustment programme of 1994 which was geared towards poverty reduction in Nigeria (Ogwumike, 2002 cited in Ben-Caleb, Faboyede, & Fakile, 2013), the attainment of vision 20–2020 (Adenekan, 2011), and the cluster development approach/content of the ministry of trade and investment in Nigeria (Iwuagwu, 2011).

2.2. Instrument/questionnaire validation

To establish the degree of reliability of the questions in the questionnaire, 20 SMEs were made to rate each question in the questionnaire on a five-point scale. Principal component analysis method was used to extract the factors. Cronbach’s Alpha was used to determine the statistical significance of the question. This method states that a scale should be greater than 0.70 for the items to be used together as a scale while factor loadings greater than 0.50 are considered statistically significant for studies with sample size less than 300. Therefore, in the present study, ±0.50 was used as the cut-off for loadings since the sample size of the study was less than 300. The higher the factor loadings were, the closer they were related to the variable.

2.3. Factor analysis of the degree of subcontracting assistance variable

A pilot test was conducted using a five-Likert scale of; 5 – significantly increased and 1 – significantly decreased. Degree of subcontracting assistance measures had a total of 7 items generated from literature as was shown in Table 2.

The analysis in Table 2 indicates that with factor loadings of between 0.71 and 0.90, the construct of the 7 measurement items was valid for degree of subcontracting assistance. The Cronbach’s Alpha coefficient for the 7 indices was = 0.92, which means the instrument had an excellent level of consistency, and fit for use in data collection.

Table 2. Factor analysis of degree of subcontracting assistance between large-scale industries and SMEs.

| Variables                | Cronbach’s Alpha |
|--------------------------|-------------------|
| Marketing                | 0.87              |
| Human Resources          | 0.78              |
| Finance                  | 0.78              |
| Purchase                 | 0.71              |
| Products                 | 0.81              |
| Organizational know-how  | 0.90              |
| Production               | 0.87              |
| No of Indices            | 7                 |
| Cronbach’s Alpha         | 0.92              |

Author’s Computation
2.4. Factor analysis of firm performance

Firm performance according to the literature is a combination of both financial and non-financial indicators. Using a 5-Likert scale of; 5- Significantly increased, and 1- Significantly decreased, validity analysis was performed for eight measurement items both financial and non-financial indicators for firm performance as was shown in Table 3.

Following the analysis in Table 3, the original 8 factors which constituted the financial and non-financial indicators of firm performance were reduced to 5 factors. This was because 3(three) factors with loadings less than 0.40 were discarded from the table. Thus, five (5) factors with factor loadings between 0.80 and 0.93 were considered valid as the constructs to represent the firm performance. The Cronbach's Alpha for these 5 (five) factors was 0.72, which exceeded the reliability cut-off value of 0.70.

2.5. Data analysis

Relevant statistical techniques such as regression, and mean and standard deviation were used to analyse the data. While regression and analysis of variance were used to define the relationship between innovation and firm performance, mean and standard deviation were used to define the Degree of subcontracting assistance SMEs receive from large-scale industries. All analyses were carried out with the aid of Statistical Packages for Social Sciences version 17 (SPSS 17)

3. Results and discussion

3.1. Degree of subcontracting assistance

For quantitative measurement regarding the different kinds of assistance, the subcontracting assistance variables were measured using a Likert type ordinal scale of between 5 and 1 (5 – significantly increased and 1 – significantly decreased). The result of this analysis revealed that the degree of subcontracting assistance through product, and production process with mean and standard deviation values of 3.11 (1.00), and 2.80 (0.92), indicate that SMEs collaborates more with their contracting large-scale industries in the area of product and production process as was shown in Table 4.

From the analysis, it was observed that while large-scale industries use the products of SMEs to complete their production tasks thereby creating a market for them, SMEs are
equally used in the area of production process to produce intermediate parts and components for the large-scale industries. This from observation was to enable the large-scale industries to meet fluctuation in demands which create excess capacity, unfulfilled orders and long delivery times. It was also observed that the demand for the production of intermediate parts or component are seasonal and unpredictable and large-scale industries subcontract them to SMEs rather than increasing their capacity to handle them in-house. This is done in a bid to save cost and spread the risk burden incurred in the production process. This type of relationship was found between SMEs in fabricated metal sector and large-scale metal industries. The large-scale metal industries depend on the SMEs for the turning and welding of metals while maintaining for forming and machining of metals in-house. This from observation has allowed the large-scale metals firms to concentrate on their core competence while subcontracting peripheral tasks to SMEs.

Furthermore, the analysis done in Table 4 equally showed that large-scale industries provide assistance to SMEs in the area of purchase process, marketing, and finance with mean and standard deviation values of 2.22 (0.75) 2.20 (0.81) and 2.05 (0.33) respectively. While purchase process involves a purchase-supply contract between large-scale industries and SMEs where the former makes advance orders from the later enabling the later to make plans on their production schedule to meet the delivery requirements, the paper found that large-scale industries provided financial assistance to the SMEs which enable them to acquire capacities in the area of machineries, skills, and technical-know-how. These capacities enable the SMEs to carry out the tasks subcontracted to them by the large-scale industries. This type of arrangement was found between the SMEs in the plastic industries and the brewery industries. It was observed that the brewery industries finance their subcontracting SMEs in order to acquire the necessary capacity with which to provide them with plastics bottles and cans used in the packaging and distribution of their products.

However, the extent of assistance provided by large-scale industries to SMEs in the area of organizational know-how and human resources with mean and standard deviation values of 1.11 (1.22) and 1.44 (0.94) respectively, were low. This finding means that large-scale industries do not extend any form of human development assistance such as training and workshop for capacity development to their small business firm partners, rather they are more inclined to production and product-related cooperation where the large-scale industries are concerned with meeting fluctuation in demand and shortening long delivery times from the small business firms. This can also be explained by the size limitations of the firms as most of the SMEs in "

| Variables            | Mean  | Std Deviation | Variance |
|----------------------|-------|---------------|----------|
| Product              | 3.11  | 1.00          | 1.01     |
| Production process   | 2.80  | 0.92          | 0.85     |
| Organization know-how| 1.11  | 1.32          | 1.73     |
| Marketing            | 2.20  | 0.81          | 0.66     |
| Human resources      | 1.44  | 0.89          | 0.78     |
| Finance              | 2.05  | 0.33          | 0.11     |
| Purchase process     | 2.22  | 0.75          | 0.56     |

Table 4. showing descriptive analysis of the degree of subcontracting assistance from large-scale industries to small business firms.

Author’s computation
study area were sole proprietors and individuals who are expected to have a lower need for reorganization. This finding differs with the work of Kumar and Subrahmanya (2010) which found that the degree of assistance between large-scale Trans-National Cooperation (TNC) and small scale enterprises in India are restricted to purchase–supply relationship where both parties are concerned with the basic requirements of purchase–supply relationship. The present study has shown that large-scale industries assist SMEs in more places (product, production, purchase, marketing and finance) than purchase- supply in Nigeria.

3.2. Degree of subcontracting assistance and innovation of SMEs

To ascertain whether the degree of subcontracting assistance offered by large-scale industries contributes to the innovation of SMEs, a regression analysis was carried out in the paper. Using the four forms of innovation-process innovation, product innovation, marketing innovation, and organization innovation adapted from OECD (2015), Results from the analysis indicated that the model was statistically significant at 0.05 level as was shown in Table 5.

The coefficients for the degree of subcontracting assistance were positive and statistically significant in all the four forms of innovation processes and statistically significant in the model. While product innovation has F.value of 4.04, process, organization and market innovation has F.values of 1.12, 5.58, and 6.99. The significance of these variables is based on the fact that large values of F support the conclusion that the overall relationship is statistically significant. This implies that the degree of subcontracting assistance is currently contributing to the innovation of SMEs in the study area. In the area of product and process innovation, it was found that subcontracting assistance from the large-scale industries gives SMEs the capacity to engage in research and development (R&D) so as to create new and improved products for their customers. This supports the work of Singh and Subrahmanya (2018) which found that the higher the network (subcontracting) assistance received from an external network (large-scale industries or firms), the greater the innovation performance of SMEs. This also supports the work of Okatch, Mukulu, and Oyugi (2011) which found that subcontracting SMEs through manufacturing gain access to new production technologies which enables them to innovate and create products requiring new production techniques, without having to invest in expensive, sophisticated production equipment.

It has equally given SMEs the opportunity to acquire new technologies with which to carry out production processes in their firms. For instance, it observed that some of the SMEs engaged in the production of table and sachet water have acquired a technology

| Variables               | Mean Sq | F.value | Significance Tv |
|-------------------------|---------|---------|-----------------|
| Product Innovation      | 0.79    | 4.04    | 0.00 2.01       |
| Process Innovation      | 0.58    | 1.12    | 0.36 2.01       |
| Organization Innovation | 5.31    | 5.58    | 0.00 2.01       |
| Market Innovation       | 3.13    | 6.99    | 0.00 2.01       |

Table 5. Regression analysis showing the degree of subcontracting assistance and its contributions to innovations of small business firms. Author’s computation
which enables them to recycle and transform used water sachets and plastics into plastic bottles with which they produce and supply water to their contractors (Hotels, Banks, etc.). This was also observed between SMEs engaged in the production of plastic products and large-scale beverage industries. The subcontracting assistance received by the former from the later was found to have given the former the capacity to produce new and quality products which the later use in the packaging and distribution of their beverage products. This also supports the work of Doh and Kim (2014) which found that a positive relationship exists in the technological development assistance by the Korean government as an industry and patent acquisitions as well as new design registrations of regional SMEs.

Similarly, subcontracting assistance was found to have contributed to both organizational and market innovation of the small business firms. The firms sampled in this study were found to have created an organizational structure which departmentalized all the activities handled by the firm. This includes creating cooperate marketing department which handle all their marking activities with contractors well as external relations. This development is rare in SMEs as they are constrained by finance to run such a structure. This supports the work of Kumar and Subrahmanya (2010, p. 13) which found that assistance received through subcontracting benefits SMEs as it increase their potentials of innovation such that, the higher the degree of assistance, the higher the level of innovations carried out by the SMEs, which, in turn, facilitated their economic performance.

3.3. Innovation and the performance of SMEs

Furthermore, using a likert scale of; 5 – significantly increased and 1 – significantly decreased; SMEs were asked to evaluate the contributions of innovation (product, process, organisation and market) to the performance of SMEs in the paper. In doing this, respondents were asked to rate the various indicators of their business performance in the last 25 (Twenty five) years between 1990 and 2015, on a scale of 5 to 1, where 5 represented -significantly increased and 1 represented -significantly decreased. Following the result, while 24.60% and 26.16 of the respondents had experienced significant increase and relative increase in the performance of their SMEs using these forms of innovation 27.86% of the respondent had not experienced changes in the performance of their SMEs as was shown in Table 6. This result by implication shows that there are other factors affecting the performance of SMEs in the study other than innovation. In other words, innovation cannot be the sole determinant of SMEs performance.

Similarly, with a total average mean response of 2.17, SME owners agreed that innovation in small and medium enterprises has generally contributed to an increased firm performance in the study. This can be accounted for by growth in sales, growth in profit, growth in product success, growth in market share and growth in workers number with mean values of 2.15, 2.82, 2.30, 2.44, and 2.04, respectively. With respect to growth in sales, growth in profit and growth in workers number, it was observed that due to the relationships that exist between the large-scale industries and SMEs the former provide an already market for the goods and services produced by the later through product and purchase assistance. This has equally lead to the later increasing their operation centres and branches in different parts of Nigeria, creating direct and...
indirect job opportunities for Nigerians. Similarly, it was observed that finances offered by large-scale industries to the SMEs have contributed to product success. Using these finances, it was observed that the products of the SMEs easily get identified in the market giving them less competition and a good opportunity to succeed.

4. Implication of study

This paper has shown that there is a subcontracting relationship between SMEs and large-scale industries in Nigeria. This relationship has shown that SMEs receive assistance from the large-scale industries while assisting the later in meeting their production activities. This relationship has equally lead to the innovativeness of the SMEs in the area of products, process, organizational and market innovations. This, therefore, departs from the dualistic theory of subcontracting which considers subcontracting as an unequal power relationship between large-scale industries (contractors) and SMEs (subcontractors). It also showed that the dichotomy between large-scale industries and small business firm is relative and can operate at the level of size differences. This is because, the changes and dynamics of demands have made firms most especially, large-scale firms to cooperate and rely on the flexibilities of SMEs to survival.

Consequently, in Nigeria, as in most situations, various opportunities exist for expanding the size of SMEs and for expanding their activities through subcontracting assistance from large-scale firms. Given the ineffectiveness of most industrial policies which has affected the SMEs sector in most part of Nigeria (Afolabi, 2013; Agwu and Emeti, 2014; Ebitu, Basil and Ufot, 2016), and the potentials of subcontracting assistance with respect to increase firm performance as was established in this paper, there is the need to institutionalize the mechanisms of subcontracting assistance between large-scale industries and SMEs as was done in Japan in 1969. The institutionalization of this process would stimulate cooperation among SMEs in all parts of Nigeria, enabling them

Table 6. Mean distribution of innovation to firm performance.

| Firm Performance Variable | Innovation Variable(s) | Significantly Decreased (1) % | Relatively Decreased (2) % | Static (3) % | Relatively Increased (4) % | Significantly Increased (5) % | Mean | Standard Deviation |
|---------------------------|-------------------------|-------------------------------|---------------------------|-------------|----------------------------|-------------------------------|-------|-------------------|
| Growth in sales           | Product, Process, Market, Organisational innovation | 2.30                          | 28.30                     | 10.00       | 19.40                      | 40.00                         | 2.15  | 0.46              |
| Growth in Profit          | Product success         | 3.50                          | 9.30                      | 16.60       | 50.60                      | 20.00                         | 2.82  | 0.80              |
| Growth in Market share    |                         | 0.60                          | 2.60                      | 39.40       | 45.10                      | 12.30                         | 2.30  | 0.36              |
| Increase in workers       | Growth in Market share  | 10.00                         | 13.40                     | 25.20       | 10.30                      | 40.10                         | 2.44  | 0.90              |
| Total Average             |                         | 5.00                          | 30.90                     | 48.10       | 5.40                       | 10.60                         | 1.16  | 0.96              |

Author’s computation
to create a niche market for themselves, grow along with large enterprises and sustain their production activities.

5. Conclusion and future work

This paper has been able to show that subcontracting relationships with large-scale industries have provided SMEs with better scope for accessing resources which have assisted in their innovation. The paper found that SMEs had more subcontracting assistance from large-scale industries through purchase and production process. The paper also found that while this relationship has contributed to the innovation of SMEs in the area of product, process, market and organizational innovation, it has equally contributed positively to the performance of SMEs in the areas of sales, market share and product success. There is however the need for this type of cooperation to evolve more. This is because the subcontracting relationship that exists between SMEs and their large-scale counterparts has no significant assistance in the area of human resource and organizational -know-how which are core areas of business performance based on customers’ needs to guarantee high quality of life and a dynamic industrial sector. This paper suggests therefore that inter-firm cooperation between SMEs and large-scale industries in the paper should not be restricted to production, purchase, finance and marketing assistance. It should also be extended to the area of human resource development and organizational -know-how. This will not only increase the human capacity level of the SMEs, it will also increase their innovativeness and competitiveness.

This paper was restricted to the study of the role of subcontracting in the innovation of SMEs in Nigeria from one part of a state. This consequently has made it relatively difficult to assess the role of subcontracting on the innovation of SMEs from other parts of Nigeria. However, considering that SMEs in Nigeria Share similar characteristics in size, resource utilization, constraints and weakness (Anga, 2014; Gbandi & Amissah, 2014; Iyortsuun, 2017), these findings can suffice in the other parts of Nigeria. Despite this, future research in this area of study should also be targeted at assessing the role of subcontracting on the innovation and performance of SMEs in other parts of Nigeria and Africa as a whole. This is to explain variations across the Nigerian space and to make definitive statements about the character and importance of subcontracting in Nigeria industrial sector. This is also because; findings from such studies would strengthen arguments in favour of integrating subcontracting strategy into the industrial and national development policies of Nigeria.

Disclosure statement

No potential conflict of interest was reported by the authors.

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APPENDIX

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|---|----------|-------------------|---------------------------|
| 1     |   | 0.47²   | 0.22              | 0.17                      |

a. Predictors: (Constant), Purchase Process, Product Process Related, Product Related, Organizational Know-How Related, Financial Related, Marketing Related, Human Resources Related

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Model Summary

| Model | Sum of Squares | df | Mean Square | F         | Sig. |
|-------|----------------|----|-------------|-----------|------|
| 1     | 5.530          | 7  | 0.79        | 4.038     | 0.001³ |
| Residual | 19.367    | 99 | 0.20        |           |      |
| Total  | 24.897         | 106|             |           |      |

a. Dependent Variable: Product Innovation
b. Predictors: (Constant), Purchase Process, Product Process Related, Product Related, Organizational Know-How Related, Financial Related, Marketing Related, Human Resources Related

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Coefficients

a. Dependent Variable: Product Innovation

| Model | Unstandardized Coefficients | Std Coef |
|-------|-----------------------------|----------|
|       | B                           | Std. Error | Beta | t     | Sig. |
| 1     | (Constant)                  | 1.042     | 0.142 | 7.339 | 0.000 |
|       | Product Related             | 0.134     | 0.036 | 0.355 | 3.747 | 0.000 |
|       | Product Process Related     | −0.121    | 0.046 | −0.293 | −2.623 | 0.010 |
|       | Organizational Know-How Related | 0.028 | 0.035 | 0.074 | 0.794 | 0.429 |
|       | Marketing Related           | 0.124     | 0.056 | 0.244 | 2.196 | 0.030 |
|       | Human Resources Related     | 0.120     | 0.063 | 0.216 | 1.897 | 0.061 |
|       | Financial Related           | −0.015    | 0.055 | −0.029 | −0.273 | 0.785 |
|       | Purchase Process            | −0.283    | 0.095 | −0.346 | −2.974 | 0.004 |

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Model Summary

| Model | Sum of Squares | df | Mean Square | F         | Sig. |
|-------|----------------|----|-------------|-----------|------|
| 1     | 4.066          | 7  | 0.581       | 1.121     | 0.356⁰ |
| Residual | 51.814     | 100| 0.518       |           |      |
| Total  | 55.880         | 107|             |           |      |

a. Dependent Variable: Process Innovation

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Coefficients

a. Dependent Variable: Process Innovation

| Model | Unstandardized Coefficients | Std Coef |
|-------|-----------------------------|----------|
|       | B                           | Std. Error | Beta | t     | Sig. |
|       | (Constant)                  | 1.170     | .231  | 5.063 | .000  |
|       | Product Related             | 0.059     | .058  | 0.105 | 1.019 | .311  |
|       | Product Process Related     | 0.052     | .075  | 0.084 | 0.693 | .400  |
|       | Organizational Know-How Related | −0.032 | .057   | −0.057 | −0.566 | .573 |
|       | Marketing Related           | 0.033     | .092  | 0.043 | 0.360 | .720  |
|       | Human Resources Related     | 0.036     | .103  | 0.043 | 0.349 | .728  |
|       | Financial Related           | 0.119     | .089  | 0.154 | 1.325 | .188  |
|       | Purchase Process            | −0.010    | .155  | −0.008 | −0.066 | .947  |
### Model Summary

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|---------------------------|
| 1     | 0.530 | 0.281    | 0.231             | 0.97511                   |

a. Predictors: (Constant), Purchase Process, Product Process Related, Product Related, Organizational Know-How Related, Financial Related, Marketing Related, Human Resources Related

### Model Summary

| Model | Sum of Squares | df | Mean Square | F     | Sig. |
|-------|----------------|----|-------------|-------|------|
| 1     | 37.166         | 7  | 5.309       | 5.584 | 0.000 |
| Residual | 95.084     | 100 | 0.951       |       |      |
| Total    | 132.250       | 107 |             |       |      |

a. Dependent Variable: Organization Innovation
b. Predictors: (Constant), Purchase Process, Product Process Related, Product Related, Organizational Know-How Related, Financial Related, Marketing Related, Human Resources Related

### Unstandardized Coefficients

| Model | Unstandardized Coefficients | Std Coefficients | Std Error | Beta | t     | Sig. |
|-------|-----------------------------|------------------|-----------|------|-------|------|
|       | B                            | Std Error        |           |      |       |      |
|       | (Constant)                  | .800             | .313      | 2.555| .012  |      |
|       | Product Related | .336             | .079      | .386 | 4.262 | .000 |
|       | Product Process Related     | .114             | .101      | .120 | 1.126 | .263 |
|       | Organizational Know-How Related | -.101       | .077      | -.118| -.315 | .192 |
|       | Marketing Related | -.105            | .124      | -.090| -.844 | .401 |
|       | Human Resources Related     | .077             | .139      | .060 | .556  | .580 |
|       | Financial Related | .230             | .121      | .195 | 1.900 | .060 |
|       | Purchase Process            | -.035            | .210      | -.019| -.166 | .868 |

a. Dependent Variable: Organization Innovation

### Model Summary

| Model | Sum of Squares | df | Mean Square | F     | Sig. |
|-------|----------------|----|-------------|-------|------|
| 1     | 21.895         | 7  | 3.128       | 6.986 | 0.000 |
| Residual | 44.771     | 100 | .448        |       |      |
| Total    | 66.667        | 107 |             |       |      |

a. Dependent Variable: Market Innovation
b. Predictors: (Constant), Purchase Process, Product Process Related, Product Related, Organizational Know-How Related, Financial Related, Marketing Related, Human Resources Related

### Unstandardized Coefficients

| Model | Unstandardized Coefficients | Std Coefficients | Std Error | Beta | t     | Sig. |
|-------|-----------------------------|------------------|-----------|------|-------|------|
|       | B                            | Std Error        |           |      |       |      |
|       | (Constant)                  | 0.798             | 0.215     | 3.717| 0.000 |      |
|       | Product Related | 0.216             | 0.054     | 0.350| 3.997 | 0.000 |
|       | Product Process Related     | 0.072             | 0.070     | 0.107| 1.035 | 0.303 |
|       | Organizational Know-How Related | 0.004       | 0.053     | 0.077| 0.569 | 0.938 |
|       | Marketing Related | .457             | .085      | 5.511| 5.369 | .000 |
|       | Human Resources Related     | -.101            | .095      | -.111| -1.060| .292 |
|       | Financial Related | .075             | .083      | .089 | .899  | .371 |
|       | Purchase Process            | -.449            | .144      | -.336| -3.116| .002 |

a. Dependent Variable: Market Innovation