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CROWDSOURCING: A STRATEGY FOR FIRM PERFORMANCE IN THE PLASTIC MANUFACTURING SECTOR IN SOUTHEAST NIGERIA

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ABSTRACT

The heavy reliance of manufacturing firms in the south-eastern part of Nigeria on their team of experts in Research and Development (R & D), to come up with new ideas and innovation, and the neglect of the input of customers in this process necessitated this study to examine the nexus between crowdsourcing and firm performance in the plastic manufacturing sector in southeast Nigeria. The work was anchored on the Human Capital Theory. The study adopted a survey research design as the most suited for the work. Two states were selected judgmentally, because of the concentration of plastic manufacturing firms in those States. Eighteen plastic manufacturing firms were selected randomly, with a population strength of 328. The sample size was 176, arrived at using Krejcie and Morgan formula. Questionnaire was the instrument for data collection, and it was subjected to content validity and reliability tests using correlation method, which returned a coefficient of 0.879. The data collected were analyzed using regression analysis through the ordinary least square method, at a 5% level of significance. Findings revealed that a positive relationship exists between the variables ($r = .973$). A 95% change in new product development was accounted for by changes in open collaboration in the

plastic manufacturing sector in Southeast Nigeria ($R^2 = .947$, $F = 2802.884$, $p\text{-value} < 0.05$). The study, therefore, concluded that involving customers in the process of new product creation is key to its acceptability by the public. As a result, it was recommended that the managers and owners of plastic manufacturing companies need to find a way to get the customers involved in their idea generation and new product creation for a sustained creditable performance.

Keywords: Crowdsourcing, Firm Performance, Plastic Manufacturing Sector, Open Collaboration and New Product Development.

INTRODUCTION

The term crowdsourcing is a relatively new phenomenon brought about as a result of the advancement in technology. Since its advent, it has gained much success that it is becoming a widely studied concept in academics. Initially, crowdsourcing practices involved computing-related jobs, such as writing lines of software code or debugging a programme. However, the inventiveness of the term shows that there is a dearth of significant literature on how this technique has been used for innovation purposes in firms (Poetz & Schreier, 2010; Marjanovic, Fry & Chataway, 2012; Zhao & Zhu, 2012). Companies have traditionally depended on an in-house staff of professional inventors to produce creative ideas. These in-house staff are seen to have the technical knowledge and expertise to improve upon successful innovations (Schulze & Hoehl, 2008). These writers hold that users might be too familiar with current consumption situations, so they are not able to describe possible future products. Amabile (1998) opine that not only creative thinking skills and incentive are key for producing novel and useful ideas, it is also essential to contemplate the skill of research and development in terms of intellectual knowledge. However, Poetz and Schreier (2010) stress the value of crowdsourcing, where users can really strive with professionals in creating new product ideas. Managers invent for themselves and these products can have high profit-making attractiveness for the firm. A major impediment to finding out the effects of crowdsourcing on innovation lies in the use of an insufficient concept measure. In spite of the rising appreciation of its significance and use in companies, public administrations, institutions and other establishments, there is no widely accepted description of the concept by the scientific community.

More so, in an attempt to endorse crowdsourcing as a unique source of open collaboration and invention strategy for firms, existing studies have narrowly addressed some aspects of the invention process such as product design (Bayus, 2013) and problem-solving (Piezunka & Dahlander, 2015). This approach shows that researchers have limited and established firm engagement with the crowd under the broad notion of inventive orientation, which consists of providing instant outcomes. Also, scholars' often associate crowdsourcing with literature rooted in setting a firm's boundaries to suggest that information does possibly occur in a more disseminated style, found outside the company (Poetz & Schreier, 2012). This study's context; crowdsourcing and firm performance is measured by open collaboration and new product innovation as these reveals the connection of the strategies found in contemporary businesses. Thus, leading to questioning whether open collaboration, which partly depends on the level of engagement with the crowd, impacts firm performance, as measured by new product development.

Manufacturing firms in the southeast as it is in most parts of the world rely heavily on their productive strength, innovativeness and customer patronage. Without these, the company may

find it difficult to compete. Traditionally, manufacturing firms rely on its team of experts in Research and Development (R & D) to come up with new ideas and innovation, however, a recent trend has shown that more can even be achieved by collaborating with the public in this aspect, as it is assumed they know and can describe best what they need, hence, bringing to the fore the importance of crowdsourcing. However, the extent to which the manufacturing firms in the Southeast have used this concept is yet unknown, hence, the justification for this study, to examine the nexus between crowdsourcing and firm performance in the plastic manufacturing sector as a broad objective. Specially, however, the study seeks to ascertain the extent open collaboration affect new product development of the plastic manufacturing sector in the Southeast.

REVIEW OF RELATED LITERATURE

Crowdsourcing Strategy

Howe (2008) conceptualizes crowdsourcing as the act of taking a job usually executed by a selected manager and outsourcing it to an undefined, generally large group of persons in the form of an open call. Similarly, Sheehan (2010) describes crowdsourcing as the ability to gather a large group of persons around your product and get them functioning to develop products or services. Estelles and Gonzalez-Ladron-de-Guevara (2012) state that it is designed from two words, crowd, making reference to the users who participate in the enterprises and sourcing, referring to several procurement actions intended at finding and engaging providers of services. In the same way, Litvin, Goldsmith and Pan (2008) hold that many customers observe that there is a combined astuteness obtainable in online social systems. In this sense, establishments contemplate this information as a market research instrument (Schmallegger & Carson, 2008) in order to obtain business brainpower about their products, services, customers and styles. Multiplicity is advantageous, both when customers cooperate to come up with a collective choice or solution, as well as when persons work autonomously with each other, but efforts are combined. Marjanovic, Fry and Chataway (2012) state that companies are involved in crowdsourcing styles since clients are interested to contribute with imaginative ideas in a freeway. But some scholars hold that as crowdsourcing practices are new, it is challenging to study their influence (Sheehan, 2010; Howe, 2008).

Crowdsourcing is connected with the idea of open invention. The open invention style (Chesbrough, 2003) has steadily changed the innovation pattern, contribution appropriateness and ample opportunities to open up the innovation activities in the firm. Firms search for ground-breaking ideas in an open culture, but it requires breaking down restrictions within and between inventions. Litvin, et al. (2008) hold that there are three open invention processes, namely: outside-in process, inside-out and the coupled process strategy. The outside-in process improves the capability of a firm by incorporating external resources in the invention process. In contrast to this process, in the inside-out process, internal information is accessible for external players. The coupled process is a connection between the previous ones and considers that two or more parties combine to take advantage of each party's precise information. There are a number of prospective issues surrounding the crowdsourcing practices that should be explored. The accomplishment of these initiatives entails that the crowd must be active and inspired. Additionally, organizations need more transparency and conviction with the online participants (Sheehan, 2010; Zhao & Zhu, 2012). When a business exposes the structures of a given problem, it gives information about its new competitive tactic or flaws of the existing

workforce. It is also important to state that crowdsourcing practices can be influenced as any other characteristic of participatory culture (Litvin *et al.* 2008; Marjanovic *et al.*, 2012).

Open Collaboration (OC)

Authors relate OC with crowdsourcing and invention (Levine & Prietula, 2014) and its application for both online and offline endeavours. These writers distinguish OC from other organizational forms such as cooperativeness. Their findings indicate that OC as a strategy performs well even in apparently unstable business environments, and they conclude that OC is viable and likely to expand into new areas. OC involves not only sharing information, but reprocessing, combining, and gathering that information, within a context of the disclosure, access, and gains (Murray & O'Mahony, 2007). It can also involve open innovation (OI), a concept that identifies the need for organizations to access external as well as internal ideas. Different authors form the relationship between OC and crowdsourcing where they consider crowdsourcing as one of the classifications of the invention (Marjanovic, Fry, & Chataway, 2012). OC and crowdsourcing are samples of the same learning pattern as knowledge is distributed and the opening of a firm's R & D methods can be a source of competitive benefit.

Firm Performance

The literature offers an uneven expression regarding the creation of or outcomes about new firm performance; although some extent of conceptual work emphases on this area, studies reconnecting institutional research with procedures that occur inside the businesses are scarce (Suddaby, Elsbach, Greenwood, Meyer, & Zilber, 2007). Greenwood and Suddaby (2006) define firm performance as a conventional arrangement of structures and practices given coherence by fundamental values regarded as applicable within an organizational context. Rao, Morril, and Zald (2000) describe firm performance as manifestations of institutional rationalities that require acceptability to become profitable. Building a classical institutional lucidity requires a combination of micro, meso, and macro-level formal work (Tracey, Phillips, & Jarvis, 2011). Thus, the formal work at the micro-level relates to prospect recognition. Research into institutional logic at the meso level concerns the plan and mechanism of firm performance and the formal work at the macro-level relates to the legality of the firm performance, which requires the creation of more multifaceted control practices involving trust and teamwork (Child & Rodrigues, 2003). Further, any institutional change alters power arrangements that delegitimize present forms and go through a critical stage of legitimation by existing or new players (Dacin, Goodstein, & Scott, 2002). On the one hand, the aspects influencing the de-institutionalization process of the obtainable rules and practices, which questions their legitimacy, are:

- a) Practical pressures, such as the current deepened competition for resources;
- b) Political pressures, such as the changes in the interest and control allocations; and,
- c) Social pressures, such as the variation of new and existing affiliates about beliefs and practices.

Conversely, the social legitimation procedures pursue the reliability or suitability of the new types of players and interest parties, of the new kind of structural arrangements.

Scott, Ruef, Mendel and Caronna (2000) posit that a complex transformation process may include:

- I. Changes in relations among existing groups
- II. Changes in borders of existing firms

- III. The advent of new populations
- IV. Changes in field boundaries
- V. Chances in governance arrangements

New Product Development (NPD)

Some authors analyze firm performance as a method to create and gather concepts from the users in new product development processes, complementing a firm's traditional NPD outlooks (Poetz & Schreier, 2012). Other scholars relate NPD to co-creation or user invention, with most of the practices comprising internet-based collaborations (Estelles-Arolas & Gonzalez-Ladron-de-Guevara, 2012), whereas some authors recognize firm performance as an invention partnership (Child & Rodrigues, 2003). Using NPD for firm performance facilitates clients' involvement in the improvement of products, following their assessments, desires, and notions. Firms can incorporate the crowd in any stage of the process, giving contributors different roles and tasks depending on which phase they join (Poetz & Schreier, 2012). Scott et al., (2000) indicate that the NPD and firm performance concepts describe very different phenomena. NPD advocates that the crowd can provide firms with resources under precise conditions, while firm performance does not imply client feedbacks in the invention procedure.

Theoretical Review

Investigations by scholars into the issues relating to crowdsourcing and/or new product invention began realizing the importance of its association in business strategies (Fagan & Ployhart, 2015). While various theories exist concerning business strategies, the Human Capital Theory (HCT) concentrates on resources from outside the firm environment. Rauch and Rijdsdijk (2013) note that the foundation premise of HCT is that firms receive compensation for their inventions in product development, market demands and capabilities. While a firm's knowledge remains the base of this theory, scholars aver that the theory persistently evolves as research occurs into the availability of rare, genuine and sustainable assets outside of the organization (The Crowd). Hence, Wright, Coff, and Moliterno (2014) concluded that contemporary organisations concentrate on strategically managing their strategies from the crowd's perspective and maintains congruence with their operations. While this strategy affects the workers, today's business managers often devise methods to strengthen and engage their entire assets either within or outside the business environment (Fagan & Ployhart, 2015; Sheehan, 2010; Greenwood & Suddaby, 2006).

Empirical Insight

Yejun Xu, Enrique Ribeiro-Soriano and Gonzalez-Garcia (2015) examined crowdsourcing, innovation and firm performance. Data were collected from a population of firms in the southern province. Hypotheses were analysed using regression analysis at a 5% level of significance. Findings revealed that there was a positive connection between crowdsourcing and the innovation of firms. Also, Tracey et al., (2011) investigated institutional entrepreneurship and the creation of firm performance: A multilevel model. Data was gotten from secondary sources and analyzed using multiple correlation statistics. It revealed that no institutional bridge was found in firms as regards innovation capabilities. Furthermore, Suddaby et al., (2007) analyzed a firm's new product development and their business environments in bringing values. In analyzing the data gotten from primary sources they indicated that no successful new product is developed without the influence of the business environment. Chesbrough (2003) investigated open collaboration: the new imperative for creating and

profiting from technology. Data was tested using regression analysis. The result revealed a complete correlation and impact of technology to open collaboration and profitability.

METHODS

The study adopted a survey research design as the most suited for the work. The area of the study is southeast Nigeria, which is one of the six geopolitical zones in Nigeria, with five states, namely; Abia, Anambra, Ebonyi, Enugu and Imo, listed alphabetically. Two states were selected judgmentally, because of the concentration of plastic manufacturing firms in those states; Abia and Anambra State. Eighteen plastic manufacturing firms were selected randomly, with a population strength of 328. The sample size is 176, arrived at by applying Krejcie and Morgan formula. Questionnaire was the instrument for data collection, and it was subjected to validity and reliability test before distribution. The validity was done using the content method while the reliability was ascertained using test re-test method within an interval of 7 days, and analyzed using the correlation method, which returned a coefficient of 0.879, indicating 88% reliability. The data collected were analyzed using regression analysis through the ordinary least square method, at a 5% level of significance.

DATA PRESENTATION AND ANALYSIS

A total of 176 copies of the questionnaire were distributed in accordance with the sample size of the study, with the help of 4 well-trained research assistants. In the end, 168 copies were returned, from where 160 copies were used (analyzed) because 8 of the returned copies were not properly filled.

Table 1

Distribution of Respondents on Open Collaboration (OC) and New Product Development (NPD)

S/N	Questionnaire Items	SA	A	UD	D	SD	Mean	Decision
Open Collaboration (OC)								
1	My firm seeks the opinion of customers before creating new products.	24	30	5	43	58	2.49	Reject
2	We have a way of communicating with customers in my firm.	40	78	-	31	11	3.66	Accept
3	My firm takes the opinion of customers very seriously.	32	40	22	32	34	3.03	Accept
4	We get feedback from customers regularly about our product.	57	47	11	33	12	3.65	Accept
New Product Development (NPD)								
5	New product ideas come from our customers.	13	46	16	35	50	2.61	Reject
6	My organization does not produce new products without consulting our customers.	-	38	13	39	70	2.12	Reject
7	We assume what customers will like and go ahead to produce them.	50	42	4	50	14	3.40	Accept
8	Our customers do not play a role in new product creation in my firm.	38	59	-	43	20	3.33	Accept

Source: Field Survey, 2021

Table 1 shows the distribution of responses on open collaboration (OC) and new product development (NPD) in southeast Nigeria. The analysis here is based on the mean of the respective questionnaire, with a threshold of acceptance of 3 and above. From the Table, it could be seen that questionnaire items 2, 3, 4, 7 and 8 are all accepted because they have means that

are more than 3 while questionnaire items 1, 5 and 6 are not accepted as a result of having means that is less than 3.

Test of Hypothesis

Table 2
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973 ^a	.947	.946	1.213

a. Predictors: (Constant), OC

Source: Field Survey, 2021

Table 2 shows the regression result for hypothesis one which states that open collaboration has an effect on new product development of the plastic manufacturing sector in Southeast Nigeria. The correlation coefficient (R) is .973, signifying that a positive relationship exists between the variables (open collaboration and new product development). The coefficient of determination (R^2) obtained is .947, indicating that approximately, a 95% change in new product development is accounted for by changes in open collaboration in the plastic manufacturing sector in Southeast Nigeria.

Table 3
ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4126.961	1	4126.961	2802.884	.000 ^b
	Residual	232.639	158	1.472		
	Total	4359.600	159			

a. Dependent Variable: NPD

b. Predictors: (Constant), OC

Source: Field Survey, 2021

The F-statistics as seen in Table 3 is 2802.884 and the sig (p-value) is .000. These figures imply that the relationship observed between open collaboration and new product development is statistically significant (not by chance). This is because, judging from the decision rule which states that we should reject the null hypotheses (H_0) if the probability value (P-value) is less than the significant value used (0.05) ($p\text{-value} < 0.05$), in which case the alternate hypothesis will be accepted. Hence, we state that open collaboration has a statistically significant effect on new product development of the plastic manufacturing sector in Southeast Nigeria.

CONCLUSION

Customer retention is the hallmark of every organization, most especially profit-oriented ones like plastic manufacturing firms. The sector they operate in is very dynamic, with customer taste and want changing almost all the time, hence, for a continuous existence and sustainability of activities, companies need to always come up with innovative products that will best serve the customers. The way in which the ideas for the creation of new products emanate is very important because, if the new product is not what the customers want, it may not succeed. Hence, this study concludes that involving customers in the process of new product creation is key to its acceptability by the public, and, therefore lead to the sustainability of the companies.

Recommendations

Following the findings of the study, it is recommended that:

- a) The managers and owners of plastic manufacturing companies need to find a way to get the customers involved in their idea generation and new product creation, as it will go a long way in boosting the acceptability of the created products.

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