This study examined the impact of Information and Communication Technology (ICT) on the performance of 12 selected Nigerian firms that are pursuing a strategy of related product-market diversification. Related diversification was measured by the extent of diversification arising from involvement in several industries of the same industry group. ICT intensity was measured by dividing the ICT budget of a company by the selling and general administrative expenses of the company. Gross margin, financial performance ratios and sales growth were used to measure performance. A cross-sectional survey research design was used to collect primary and secondary data for the study. Convenience sampling technique was used to select the sampled firms while purposive random sampling method was used to select 426 respondents who served as multiple informants for the survey. A five-point Likert scale was used to measure the opinions of the respondents on the level of product-market diversification and ICT usage in their firms. The result of the independent sample t-test revealed a statistically significant difference between the performance of firms that have a high level of ICT and those that have a low level of ICT with the former group performing better than the later group. The result of the regression analysis showed that the intensity of ICT has a significant influence on the performance of firms that are using a related product-market diversification strategy with a coefficient of 5.179. The $R^2$ obtained showed that the total variability in the corporate performance of a related product-market diversifier can be explained by the intensity of ICT thus making ICT intensity a good predictor of organizational performance. The study concludes that the performance impact of related product-market diversification is not the same for all firms and is largely relative and determined and moderated by the intensity of ICT in a firm.

Key words: Performance, product-market diversification, information and communication technology, business resources.

INTRODUCTION

Diversification has become a popular strategy among Nigerian firms. In a study of the impact of product-market diversification strategy on the performance and growth of 48 Nigerian companies, it was found that 30 (or 62.5%) of them were pursuing either related, unrelated or mixed diversification strategies while 18 (or 37.5%) of the sampled firms followed a specialization strategy (Oyedijo, 2012). Diversification strategy is an option pursued by companies when they have consolidated their positions in their base industries and hold underutilized resources that can be used in other sectors of the economy at a low opportunity cost (Chandler, 1962). The main purpose of diversification is to increase the benefits of economies of scope through a more efficient utilization of business resources across multiple markets (Clarke, 1985).
To achieve these benefits, effective co-ordination of dispersed business resources is essential. The high costs of co-ordinating resources in multiple markets may undermine the benefits of these economies of scope (Montgomery, 1994). However, the use of information and communication technology is a means of reducing the costs of co-ordination of business resources and decisions across multiple markets and leveraging the economic benefits of diversification.

According to Shin (2001), diversification can increase the demand for information and communication technology (ICT) because of the need for co-ordination of business resources across multiple markets. The extent to which a firm is able to meet this demand can probably make a difference in performance. In other words, it can be hypothesized that increased use of ICT improves the performance of firms that are highly diversified. In the study of 48 Nigerian firms mentioned above (Oyedijo, 2012), it was found that related diversifiers performed better than unrelated and mixed diversifiers. However, possible differences in the performance of related diversifiers and the probable factors explaining such differences were not investigated. The question then remained whether the increased use of ICT among other organizational resources improves the relative performance of some related diversifiers and whether a low use of ICT results in a reduced performance for others. In other words, will firms that are pursing related diversification that use ICT intensively perform better than firms that are in the opposite category? It is speculated that this might be the case. However, only a few studies including the previous research mentioned above (Montgomery, 1994; Shin, 2001) have provided empirical evidence to support this hypothetical answer. This paper therefore examines this question i.e. the performance impact of ICT on 13 related diversified firms in Nigeria with the aim of providing empirical evidence to determine the relationship between the two. The 13 related diversifiers in the study by Oyedijo (2012) were identified and isolated for this further investigation.

1. LITERATURE REVIEW

According to economic theory, a firm is a bundle of tangible and intangible resources that can be used to perform several separate activities. However, some resources are relatively product-specific and may therefore be utilized to produce only a particular product or service through one business line. Other resources, however, may be used to increase the production of goods or services in multiple areas of business. If such resources are insufficiently utilized in the firm’s current product-market, then it may be economically profitable to extend their use to other business activities. In this case, the firm will use the resources – physical, human and intangible – efficiently by diversifying its operations into multiple markets (Caves, et al., 1980; Clarke 1985).

A firm can diversify its operations into related markets in order to achieve economic benefits by sharing physical, human and intangible resources across those markets. According to Hill (1988), firms pursue a related diversification strategy in order to realize economic benefits from the exploitation of the interrelationships between divisions, through the pooling and sharing of physical and human resources, to achieve economies of scope and sharing marketing or technological resources to achieve economies of scale. A firm that pursues a related diversification strategy however can only achieve tangible economic benefits by increasing the intensity of co-ordination and communication among the different business lines (Hill and Hoskisson 1987, Hill 1994). Consequently, a related diversifier needs to consider the
costs of co-ordinating resources including the costs of sharing information across related multiple markets and bring such costs down (Williamson, 1975). According to Hill (1988) firms pursuing a related diversification strategy cannot realize the benefits from an internal capital market because the interrelationships between divisions require centralized decision-making in order to facilitate co-ordination between divisions. Because centralized decision-making makes it difficult to determine the efficiency of individual divisions, the firm increases the amount of information it processes in order to overcome this equivocality problem (Hill, 1988).

According to Hill and Hoskisson (1987) and Hill (1994), unrelated diversification strategy does not require as much co-ordination as related diversification. The general conclusion from previous studies on the relationship between the mode of diversification and performance Rumelt, 1974, 1982; Caves et al., 1980 Lecraw 1984, Montgomery 1985, 1994, Pelepu 1985, Montgomery and Wernerfelt 1988, Wernerfelt and Montgomery 1988, Oyedijo 2012) is that related diversification improves performance while unrelated diversification does not, that is, related diversifiers are more profitable than firms diversifying into unrelated product-market areas.

According to Shin (2004), although related diversification can lead to higher corporate performance when compared to unrelated diversification, The realization of economic benefits from related diversification is highly dependent on increased co-ordination and information processing across related businesses i.e. whether or not special technologies, production skills, industry knowledge, distribution channel, resource inputs, and research facilities and competencies of one business are easily transferable and usable by another.

Although the previous studies cited above have shown that related diversifiers perform better than unrelated and mixed diversifiers, the performance differences between related diversifiers have not received attention among researchers. It is strongly speculated and assumed that the intensity of ICT infrastructure and competence in an organization might play a key role in explaining such differences.

Shin (2001) in an examination of the impact of information technology on the performance of diversified firms concluded that the complementarity of ICT and diversification in firm performance is important. ICT is widely used to share information and to co-ordinate business resources such as physical resources, managerial expertise, technical knowledge and market information across multiple markets (Malone et al., 1987; Gurbaxani and Whang 1991; Clemons et al., 1993; Shin 2001, 2004). By lowering the costs of sharing information and co-ordinating business resources, ICT can enable scope economies and efficient utilization of business resources across multiple product-market areas. Dewan et. al., (1998) have argued that diversification, particularly related diversification, is likely to increase the need for co-ordination and information processing. According to Hill (1999), firms diversify into new product markets because ICT makes it possible for them to co-ordinate diverse production and marketing activities. He argues further that increased related diversification requires a higher demand for ICT capital. As argued earlier, most previous studies have failed to address the performance differences between related diversifiers. By grouping related diversifiers according to the level of their ICT capital and infrastructure and comparing their performance over a period of time, this research might be able to demonstrate that the effect of related diversification strategy is not the same for all firms but may well depend on the extent of ICT capital and infrastructure and the choices that are made by different firms.
Hypotheses
At a general level, we hypothesize as follows:
That performance implications of related product-market diversification strategy depend on the intensity of ICT i.e. the success or financial performance and growth of a related diversified firm is determined by the intensity of ICT in the firm. More specifically, we hypothesize as follows:

**Hypothesis 1**
Related diversifiers that have developed a high level of information and communication technology will perform better than those that have a low level of ICT.

**Hypothesis 2**
The intensity of information and communication technology will have no effect on the performance of firms that are using a related product-market diversification strategy.

2. METHODOLOGY

3.1 Operationalization and Measurement of Variables

**Related Diversification**
This was measured by the extent of diversification arising from operations in several industries of the same industry group.

**Information and Communication Technology Intensity**
This was operationalized as the amount of attention given to ICT by a company and was measured by dividing the ICT budget of a company by the selling and general administrative expenses of the company. This measure had been used in a previous study by Shin (2004).

**Performance**
Gross margin and financial performance ratios (i.e. return on assets and return on equity) were used to measure financial performance. Sales growth was also used as a measure of performance.

3.2 Population, Sample and Data Collection

The purpose of this paper is to examine the role of ICT as a determinant of the effectiveness of related product-market diversification strategy using data from a sample of firms in Nigeria. In order to achieve the objective, a cross-sectional survey design was used for collecting data from a defined population. The justification for use of cross-sectional survey design, according to Akinyele (2011), is that it is easy to undertake compared to longitudinal survey and the result from the sample can be inferred to the larger population. In addition, some extraneous factors could have manifested in the observed changed in a longitudinal study other than the independent variable concerned.

Using a 5-point Likert scale, responses were sought from the sampled manufacturing companies on a wide range of issues relating to product-market diversification and level of usage of ICT for the co-ordination of organizational activities and information processing across related businesses.

The target population in this study consisted of 13 selected related product-market manufacturing firms in Nigeria. Related diversification is development beyond the present product and market, but still within the broad confines of the industry (i.e. value chain) in which the company operates. Firms pursuing related diversification
are characterized by medium heterogeneity of customers, some product and technological similarity and a medium unit interdependence. The convenience sampling technique was used to draw the sample for the study. One of the original 13 firms in the previous study by Oyedijo (2012) was dropped because of the security challenge that was encountered in the process of travelling to its headquarter location in Northern Nigeria at the time of this study. The sampled firms were of relatively equal size in terms of capital base and number of employees, and they shared other similar characteristics such as length of existence, ownership, geographical location and industry. The sample therefore consists of 12 selected related product-market diversified manufacturing firms whose headquarter offices were located in Lagos State, the commercial nerve centre of Nigeria. This resulted in a very effective coverage and a lower cost.

Questionnaire was administered on the top managers, as well as the information technology personnel, finance executives and other key management staff of each of the sampled manufacturing firms using a physical contact approach. The management staff of every selected firm were approached and persuaded to fill the questionnaire. These individuals were pleaded with to see the relevance of the study to their organisations. After much persuasion and explanation, their cooperation was assured and secured.

Probability random sampling technique as well as purposive sampling method were used in selecting the respondents. A total of 600 copies of the questionnaire were administered on the firms but 426 were completed and returned. This represents 71.0 percent response rate. According to Saunders, Lewis and Thornhill, (2003), a sample is a part of the entire population carefully selected to represent that population. The justification for using random sampling technique is that it eliminates the possibility that the sample is biased by the preference of the individual selecting the sample (Bordens and Abbott, 2002). Another justification is that it is particularly necessary when one wants to apply research findings directly to a population (Mook, 1983).

3.3 Model Specification

The basic model of this study is specified thus:

\[ \text{PERF} = f(\text{ICT}) \]

Where:

PERF = performance

ICT = Information and communication technology

Performance = return on assets (ROA); return on equity (ROE); sales growth (SG)

Information and communication technology = amount of attention given to ICT.

Explicitly stated:

return on assets (ROA); return on equity (ROE); sales growth (SG) = f(amount of attention given to ICT)
3. DATA ANALYSIS AND RESULTS

In carrying out the data analysis, a regression analysis was performed using the Statistical Package for Social Sciences Research (SPSS) software while taking into cognizance our information and communication variable (ratio of ICT budget of the firms to selling and general administrative expenses) and performance indices, that is, return on assets, return on equity and sales growth respectively. In this case ratio of ICT budget of the firms to selling and general administrative expenses represent the independent variable while the return on assets, return on equity and sales growth are dependent variables. Regression is used to determine the amount of variations in the dependent variable which can be associated with changes in the value of an independent or predictor variable in the absence of other variables. Independent t-test was also used in examining whether there is a significant difference between the performance of related product-market diversifiers that have a high level of information and communication technology and the performance of those that have a low level of ICT.

However, a mean index of performance variable was adopted to summarize the data (Simon, 2002). This is shown in Table 1 that follows.

**Table 1: Mean index of corporate performance**

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Frequency</th>
<th>Average Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>return on assets</td>
<td>426</td>
<td>4.39</td>
</tr>
<tr>
<td>return on equity</td>
<td>426</td>
<td>4.16</td>
</tr>
<tr>
<td>sales growth</td>
<td>426</td>
<td>4.23</td>
</tr>
<tr>
<td><strong>Mean of means</strong></td>
<td></td>
<td><strong>4.28</strong></td>
</tr>
</tbody>
</table>

*Source: Survey 2012*

In Table 1 above, the mean index of participating firms concerning corporate performance was 4.28.

**Hypothesis 1**
H1: Related product-market diversifiers that have a high level of information and communication technology will perform better than those that have a low level of ICT.

To analyze this hypothesis, independent samples test was used. The difference was observed under two headings: group statistics and independent samples test.

**Table 2a: Group statistics**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>ICT Usage</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>corporate performance index</td>
<td>High</td>
<td>318</td>
<td>4.0871</td>
<td>0.24107</td>
<td>0.06316</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>108</td>
<td>3.2884</td>
<td>0.59340</td>
<td>0.03726</td>
</tr>
</tbody>
</table>

**Source:** Author’s Computation (2012).

**Table 2b: Independent samples test**

<table>
<thead>
<tr>
<th>Corporate Performance</th>
<th>T</th>
<th>Df</th>
<th>Sig (2-tailed)</th>
<th>Mean Difference</th>
<th>Upper</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-10.743</td>
<td>426</td>
<td>0.000</td>
<td>-0.26495</td>
<td>-0.68019</td>
<td>-0.46933</td>
</tr>
</tbody>
</table>

**Source:** Author’s Computation (2012)

The results of the independent sample t-test as revealed in Table 2a show that performance mean index (4.08) of firms that have a high level of information and communication technology is different from the performance mean index (3.28) of firms that have a low level of information and communication technology. This difference between the two mean was found to be statistically significant at p<.05 level (Table 2b). Therefore, the null hypothesis which states that there is no significant difference between the two categories of firms is rejected. Thus, there is a significant difference between the performance of firms that have a high level of information and communication technology and those that have a low level of information and communication technology. This finding shows that a marginal
change in the level of investment and adoption of ICT by related product-market diversified firms will lead to a corresponding proportionate increase in the level of corporate performance measured by return on assets, return on equity and sales growth. This is expected because information and communication technology (ICT) offers enormous opportunities such as storing, processing, retrieving, disseminating and sharing of information (Idisemi and Latham, 2009). In a related report, Ongori (2009) cited by Idisemi and Latham (2009) states that the adoption of ICT offers the potential for changing the way businesses operate in this era of globalisation by changing business structures and operations and creating competitive advantage for businesses. In his empirical study on information and communication technology and bank profitability in Nigeria using Ordinary Least Square econometric technique, Obasan (2011) also found out that a positive correlation exists between ICT and the profitability of banks in Nigeria.

**Hypothesis 2**

H1: The intensity of information and communication technology will have no effect on the performance of firms that are using a related product-market diversification strategy.

**Table 3: Presentation of Results**

<table>
<thead>
<tr>
<th>Dep.Variable: Organization Performance</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Sig.</th>
<th>R</th>
<th>R² Adjusted</th>
<th>F Ratio</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>19.639</td>
<td>7.600</td>
<td>0.000</td>
<td>0.696</td>
<td>0.318</td>
<td>24.605</td>
<td>0.000</td>
</tr>
<tr>
<td>ICT</td>
<td>5.179</td>
<td>1.614</td>
<td>0.000</td>
<td>0.529</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author's Computation (2012)*

The above hypothesis was tested by a regression analysis. The results of the regression analysis are shown in Table 3. The Table shows that the analysis of variance of the fitted regression equation is significant with F value of 24.605. This is an indication that the model is a good one. Since the p-value is less than 0.05, it shows a statistically significant relationship between the variables at 95 percent confidence level. The results also indicate that information and communication technology (ICT) actually influences the performance of firms that are using a related product-market diversification strategy in Nigeria with a coefficient of 5.179.
Therefore, the null hypothesis of no significant impact is rejected. Thus, information and communication technology has a significant impact on the performance of a related product-market diversifier. In other words, the intensity of information and communication technology has a significant effect on the performance of firms that are using a related product-market diversification strategy. This result is not surprising because ICT plays a complementary and enabling role in the effective implementation of a related product-market diversification strategy. This role includes the sharing of information as well as the co-ordination and leveraging of business resources including managerial expertise, technical knowledge and market intelligence across related multiple markets. Generally, ICT helps in lowering the cost of sharing information and co-ordinating business resources and enables economies of scope and enhances efficient utilization of such resources thus leading to a higher organizational performance. The $R^2$ statistic in Table 4 indicates that the model as fitted explains 52.9 percent of the total variability in the firms’ performance. In other words, 52.9 percent of the total variability in corporate performance can be explained by the intensity of information and communication technology. The value of $R^2 = 0.529$ shows that information and communication technology is a good predictor of corporate performance. The finding is in tandem with Obasan (2011), who found out a positive correlation between ICT and banks profitability in Nigeria. In a related finding, Ashrafi and Murtaza (2008) studied the use and impact of ICT on SMEs in Oman using exploratory technique. The study revealed that majority of the surveyed SMEs have reported a positive performance and other benefits by utilizing ICT in their businesses.

4. **CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH**

On the basis of the findings obtained from this study, it may be concluded that the performance impact of related diversification is not the same for all firms and is largely relative and determined by the intensity of ICT in a firm. This result and conclusion have important implications for strategic management policy, practice and theory. It implies that the choices that are made by managers of related diversified firms on ICT expenditure and infrastructure may determine the performance or success of such firms relative to their competitors. It suggests that the related diversification mode in itself is not a sufficient criterion to achieve a sustainable differential advantage over firms pursuing other modes of diversification.
In terms of theory and research, the result suggests that a number of organizational and managerial factors and attributes, such as ICT, can affect the effectiveness of related diversification strategy. Such factors and attributes can be investigated by future researchers in order to provide a deeper and better understanding of the forces at work. Particular attention can be paid to the influence of organizational structure and employee management style. Furthermore, the use of case study method and longitudinal data by future researchers could shed more light on the business value of ICT in firms that are pursuing a related diversification strategy.

REFERENCES


