Relationship Between Competitive Intelligence and Competitive Advantage in Manufacturing Industry

Owonye Benedicta

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Abstract
The business environment of today is complex and dynamic due to increasing global competition. The businessman needs to master and know all the information that has strategic value, and Competitive Intelligence is positioned as the most appropriate tool to achieve this goal. Strategic and innovative intelligence were the objectives for this study using a survey. In recent decades, research and publications related to Competitive Intelligence have been increasing, although the military heritage of this field of research and the association with large corporations has meant that the literature is still at an early phase of development and specialization. Competitive Intelligence is closely linked to innovation processes in companies, facilitating its development. Furthermore, it highlights the importance that business management, together with the promotion of absorptive capacity and alignment around Competitive Intelligence will allow companies to improve their competitive advantages, as well as greater success with new products. Descriptive and inferential statistics was used in the analysis. A sample size of 153 was determined using Kotari’s formula. Little research was found on aspects related to small and medium-sized enterprises and patents in relation to Competitive Intelligence.

Keywords:
businessman; competitive advantage; competitive intelligence; manufacturing industry; relationship;

Corresponding author:
Owonye Benedicta,
Department of Accounting, Banking and Finance, Delta State University, Abraka, Nigeria.
Email address: bennyifili@yahoo.com

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1 Introduction

Globalisation presents new challenges that considerably increase the complexity of the environment surrounding companies (Hitt et al., 2000). More specifically, the global economy has had a direct impact on competitiveness and security, which has changed these concepts and their approaches. Today’s business environment is much more complex, where the interests of external operators generate a dynamic environment (Chaki, 2015). This dynamism of today’s business environment makes companies increasingly dependent on a system of early detection of changes in order to be able to respond appropriately (Kahaner, 1996). However, companies need time and resources to adapt to the changing environment, where they will have to deal with risks and threats that undermine their security and sustainability. Therefore, companies need to develop complementary, synergistic, interactive and goal-oriented efforts in pursuit of shared objectives and interests (Tuan, 2016).

Against this background, Competitive Intelligence (CI) is presented as a strategic discipline that helps organisations to adapt to changes in the environment (Sewdass, 2012), and to cope with industry disruptions (Vriens & Søilen, 2014). CI allows organisations a better understanding of the business and industry environment, as well as continuous learning from competitors’ corporate and business strategies. The risk inherent in the choice of competitive strategies for an organisation, which is fundamental to achieving success in today’s competitive conditions (Calof & Sewdass, 2020). Competitive intelligence is not a recent business activity (Calof & Wright, 2008). Although it has generally been associated with strategic and knowledge management (Shujahat et al., 2017), today it is recognised as a relatively new field of study (De Pelsmacker et al., 2005). Little is known about the scope of IC research and about IC as a field of academic study (Du Toit, 2015). Furthermore, there is a diversity of approaches used caused mainly by the multidisciplinarity of the subject matter (Cavallo et al., 2020; Walker et al., 1994). The first IC dynamics related to the business world were carried out in the knowledge areas of Business Administration and Management, Marketing and Information Sciences, and later evolved to Computer Engineering and Operations Research (Schwarz, 2007; López-Robles et al., 2019).

As with other fields of study where the domain and scope of application is varied, there is no consensus on the definition of Competitive Intelligence (Pellissier & Nenzhelele, 2013). The multiple approaches, definitions and disciplines related to Intelligence can result in difficulties when investigating, just like the one that is presented. However, in relation to the business and organizational environment, the term Competitive Intelligence is positioned as one of the most developed and disseminated throughout the literature (López-Robles et al., 2019), and we also consider that the term Competitive Intelligence is the one that presents a more global character and that gathers most of the aspects that organizational intelligence can show (Varela, 2005).

Objectives of the study

The main objective of the study is to examine the relationship between competitive intelligence and competitive advantage in manufacturing industry. The specific objectives are:

- To examine the strategic intelligence on competitive advantage in the manufacturing industry.
- To ascertain the effect innovative intelligence on competitive advantage in the manufacturing industry.
- To ascertain the effect of human intelligence network on competitive advantage in the manufacturing industry.

2 Methods

Research design

The study adopted descriptive survey design. Its purpose will be to establish relationships between the independent variables of study and competitive advantage in the manufacturing industry. In descriptive research design records is amassed without changing the surroundings. This layout were deemed suitable as it gives an outline of a collection of people, phenomena or an event based on the impact on any other variable (Marcus, 1968; Ruffino, 2014).

Population of the study

The population of this study was limited to staff of Wonder Pack Plc, Whictech Aluminium Limited and Flight Aluminium Plc in Asaba, Delta State. The sampling object of the study will be the staff of Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc which their responses will be collected with aid of structured questionnaire (Albort-Morant & Ribeiro-Soriano, 2016; Asghari et al., 2020). Hence, from this, the staff Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc would serve as our respondents. The total number of staff of the three manufacturing companies is depicted in the table below:

<table>
<thead>
<tr>
<th>Name of Company</th>
<th>Location</th>
<th>Number of Contract Staffs</th>
<th>Number of Core Staffs</th>
<th>Total Number of Staffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wonder Pack Limited</td>
<td>Asaba, Delta State</td>
<td>88</td>
<td>28</td>
<td>116</td>
</tr>
<tr>
<td>Whictech Aluminium Limited</td>
<td>Asaba, Delta State</td>
<td>47</td>
<td>9</td>
<td>56</td>
</tr>
<tr>
<td>Flight Aluminium Plc</td>
<td>Asaba, Delta State</td>
<td>61</td>
<td>14</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>247</strong></td>
<td></td>
<td><strong>247</strong></td>
</tr>
</tbody>
</table>

Source: Personnel managers of the firms

Thus, the populations of this study will be two hundred and forty-seven (247) respondents.

Sample size determination and sampling techniques

Since the sample size is finite population and known by the researchers, the total sample size for this study were obtained using the formulae developed by (Kothari, 2014). Stated that:

\[ n = \frac{N}{1 + N(\alpha)^2} \]

Where:
- \( n \) = the sample size,
- \( N \) = the sample frame (population=247)
- \( \alpha \) = the margin of error (0.05%).

\[ n = \frac{247}{1+247(0.05)^2} = 152.70 \]

The sample size is 153. The study adopted the simple random technique because the simple random sampling is a method used to cull a smaller sample size from a larger population and use it to research and make generalizations about the larger group. The advantages of a simple random sample include its ease of use and its accurate representation of the larger population (Weerawardena & Mavondo, 2011; Kotabe & Murray, 2004).

Research instrument

The study employed the structured questionnaire with close-ended questions. The questionnaire were divided into two sections (A and B) containing questions on respondents profile and another in closed ended questions pattern. This will be help to guide respondents’ to provide answer within the choices given to ensure they stay in focus with the study objectives. To this end, respondents will be presented with descriptive statements in a 5-point Likert scale in which they will be required to rate the scoring to the extent to which they perceived a particular statement (Rouach & Santi, 2001; Teo & Choo, 2001).

Validity and reliability of research instruments

The present study will perform content validity testing which will consist of administering the questionnaire to 10 marketing experts and consulting with my project supervisor who will give their feedback on the extent to which the indicators correctly represent the concept of the study (Changhoo et al., 1998; Bartes, 2014). Their feedback will then
be use to improve the questionnaire. To ensure reliability in this study, the questionnaire will be pre-tested on selected respondents; the aim of doing this was to allow changes on various items of the questionnaire. To test data reliability the study will employ Cronbach’s alpha coefficient whose value falls between zero (0) and one (1). Cronbach’s alpha (α) indicates the extent to which a set of test items can be treated as measuring a single latent variable. Higher values of this coefficient mean that scales are more reliable. A value of 0.7 is acceptable and a minimum level of 0.6 is also considered good. The recommended value of greater than 0.7 will be adopted for this study (Lee et al., 2013; Lieder & Rashid, 2016).

Analytical tools

The completed questionnaires will be first edited for completeness and consistency. The data will be split down into different aspects of competitive intelligence and competitive advantage. This will offer a quantitative and qualitative analysis of the study objectives (Putra et al., 2020; Chanana, 2016). Descriptive data were presented using measures of central tendency like mean and standard deviation. The researchers also conducted correlation and multiple regression analysis in order to establish the relationship between measures of competitive intelligence on competitive advantage in Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc in Asaba, Delta State, Nigeria. The dependent variable which is Competitive Advantage (CA) expected to be influenced by the measures of Competitive Intelligence, namely; Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN). The model is specified as follows:

\[
CA = f(SI, II, HIN) = \beta_0 + \beta_1SI + \beta_2II + \beta_3HIN + \epsilon
\]

Where:
CA = competitive advantage
\(\beta_0\) = constant
SI = strategic intelligence
II = innovative intelligence
HIN = human intelligence network
\(\epsilon\) = error term

3 Analysis Data, Result and Discussions

This section presents analysis of the data on the relationship between competitive intelligence and competitive advantage in manufacturing industry; specifically; three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria. The study targeted a sample of 153 respondents out of which 129 respondents gave their responses giving a response rate of 84%. This response was excellent and representative of the population and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and above is excellent. Thus, the sample to be used for the study was the total of one hundred and twenty-nine (129) respondents from staffs in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria (Zahra & Covin, 1995; Morris & Paul, 1987).

Analysis of data according to research questions

This section seeks to analyze the research question one by one and analyze the responses of the respondents and bring out the effect of the study for proper analysis. These were done with the aid of descriptive statistics (Bergeron & Hiller, 2002; Berkowitz, 1993). The descriptive statistics which comprises of the minimum, maximum, mean and standard deviation was employed proper and thorough description of the independent variables [measures of Competitive Intelligence, namely; [Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN)] and dependent variable [Competitive Advantage (CA)] for this study.

Table 2
Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI</td>
<td>129</td>
<td>12</td>
<td>20</td>
<td>16.86</td>
<td>1.960</td>
</tr>
<tr>
<td>II</td>
<td>129</td>
<td>12</td>
<td>20</td>
<td>16.03</td>
<td>2.050</td>
</tr>
<tr>
<td>HIN</td>
<td>129</td>
<td>12</td>
<td>20</td>
<td>16.33</td>
<td>1.917</td>
</tr>
<tr>
<td>CA</td>
<td>129</td>
<td>11</td>
<td>20</td>
<td>16.15</td>
<td>2.012</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>129</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS Version 23 Output, 2021

The descriptive statistics for Strategic Intelligence (SI) for three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria indicated a mean of 16.86, a standard deviation of 1.960 with the difference in the maximum and minimum values which stood at 8. This implies that the Strategic Intelligence (SI) of three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, varies drastically, since the mean value is greater than the standard deviation value. Similarly, the descriptive statistics for the independent variable shows that Innovative Intelligence (II) has minimum value of 12 and maximum value of 20 leading to the mean and standard deviation of 16.03 and 2.050 respectively. This implies that the Innovative Intelligence (II) for three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria varies significantly and this is also reflected in the variation of the competitive advantage. Also, the descriptive statistics for the independent variable shows that Human Intelligence Network (HIN) has minimum value of 12 and maximum value of 20 leading to the mean and standard deviation of 16.33 and 1.917 respectively. This implies that Human Intelligence Network (HIN) for three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, varies drastically, since the mean value is greater than the standard deviation value. Finally, Competitive Advantage (CA) indicates a mean of 16.15, a standard deviation of 2.012 with the maximum and minimum values of 11 and 20. The high discrepancy between the maximum and minimum value shows that Competitive Advantage (CA) is majorly influence by the measures of Competitive Intelligence [Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN)] (Bernhardt, 1994; Butterfield et al., 2000).

Correlation results

The section presents the correlation result of the explanatory variables and the explained variable. The correlation matrix is used to examine the linear association between the independent and dependent variables and also between the independent variables. The study therefore adopted person correlation co-efficient to assess the level of association between the variables concerned (Caseiro & Coelho, 2019; Dishman & Pearson, 2003). The table below shows the correlation between the dependent variable which is Competitive Advantage (CA) and independent variables identified to be Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN) (measures of Competitive Intelligence).

Table 3
The correlation matrix for the variables under study

<table>
<thead>
<tr>
<th></th>
<th>CA</th>
<th>SI</th>
<th>II</th>
<th>HIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>.413</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>.402</td>
<td>.431</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>HIN</td>
<td>.387</td>
<td>.505</td>
<td>.534</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: SPSS Version 23 Output, 2021

The Strategic Intelligence (SI) has a coefficient of (r = 0.413>0.05) which reveals that Strategic Intelligence (SI) has a strong positive correlation with Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited,
Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria. The Innovative Intelligence (II) has a coefficient of (r= 0.402>0.05) which reveals that Innovative Intelligence (II) has strong positive correlation with Competitive Advantage (CA), this implies that when Innovative Intelligence (II) is properly utilized in manufacturing firms, it would have positive effects on Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria.

The Human Intelligence Network (HIN) has a coefficient of (r= 0.387>0.05) which reveals that Human Intelligence Network (HIN) has strong positive correlation with Competitive Advantage (CA), this implies that a proper utilization of human intelligence network, would have positive effects on Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria.

<table>
<thead>
<tr>
<th>Table 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple regression analysis of measures of competitive intelligence and competitive advantage</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>SI</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>HIN</td>
</tr>
</tbody>
</table>

a. Dependent Variable: CA

Source: SPSS Version 23 Output, 2021

Strategic intelligence (SI) and competitive advantage (CA)

The Table 4 above, showed the regression coefficient of Strategic Intelligence (SI) of 0.246 with a t-value of 2.653 and associated p-value (sig. value) is 0.009. This suggests that Strategic Intelligence (SI) has a positive effect on Competitive Advantage (CA). This implies that, the effect is significant given the fact that the p-value of 0.009 is lesser than that 0.05 (5%) level significance. The coefficient of Strategic Intelligence (SI) is 0.246 which implies that Strategic Intelligence (SI) has a positive trend with Competitive Advantage (CA). One percent (1%) movement in Strategic Intelligence (SI) would lead to 24.6% increase in Competitive Advantage (CA). Strategic Intelligence (SI) has a significant influence on Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria.

Innovative intelligence (II) and competitive advantage (CA)

From Table 4 above, the coefficient of Innovative Intelligence (II) is 0.219 with a t-value of 2.337 and associated p-value (sig. value) is 0.022. This suggests that Innovative Intelligence (II) has positive effect on Competitive Advantage (CA). This implies that, the effect is significant given the fact that the p-value of 0.022 is lesser than that of 0.05 (5%) level significance. The coefficient of Innovative Intelligence (II) is 0.219 which implies that Innovative Intelligence (II) has a positive trend with Competitive Advantage (CA). One percent (1%) movement in Innovative Intelligence (II) would lead to 21.9% increases in Competitive Advantage (CA). Innovative Intelligence (II) has a significant influence Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria.

Human intelligence network (HIN) and competitive advantage (CA)

Finally, the coefficient of Human Intelligence Network (HIN) is 0.146 with a t-value of 1.485 and associated p-value (sig. value) is 0.142. This suggests that Human Intelligence Network (HIN) have positive effect on Competitive Advantage (CA). This implies that, the effect is insignificant given the fact that the p-value of 0.142 is greater than that 0.05 (5%) level significance. The coefficient of Human Intelligence Network (HIN) is 0.146 which implies that

Human Intelligence Network (HIN) has a positive effect on Competitive Advantage (CA). One percent (1%) movement in Human Intelligence Network (HIN) would lead to 14.6% increase in Competitive Advantage (CA). Human Intelligence Network (HIN) has an insignificant influence on Competitive Advantage (CA) in three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria.

Table 5
Model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.896&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.803</td>
<td>.798</td>
<td>1.768</td>
<td>1.865</td>
</tr>
</tbody>
</table>
| a. Predictors: (Constant), HIN, SI, II 
| b. Dependent Variable: CA |

Source: SPSS Version 23 Output, 2021

Also, The table 5 which is model summary table show the correlation co-efficient (R) of the regression is 0.896 (89.6%) which indicates a very strong positive relationship between the dependent variable [Competitive Advantage (CA)] and the independent variables [Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN)]. The co-efficient of determination (R<sup>2</sup>) is 80% (0.803) showing that 80% of the variation in dependent variable [Competitive Advantage (CA)] has been explained by the independent variables [Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN)]. While 20% remain unexplained in the model. With an R<sup>2</sup> value of 80% showed that the strong positive relationship is further confirmed. The adjusted R<sup>2</sup> measures the goodness or fit of the model. This shows the goodness of fit of the model and also explains the dependent variable in relation to the independent variables in 80 ways. The 20% left is known as the error term and other variables outside the model. From the above, there is conclusive evidence of serial or autocorrelation since the Durbin Watson calculated value of 1.865 is less than “2”.

Table 6
ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>127,388</td>
<td>3</td>
<td>42.463</td>
<td>13.582</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>390.813</td>
<td>125</td>
<td>3.127</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>518.202</td>
<td>128</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| a. Dependent Variable: CA 
| b. Predictors: (Constant), HIN, SI, II |

Source: SPSS Version 23 Output, 2021

Lastly, the Anova shows the overall significance of the significance of the model, has F(13.582) with p-value is estimated at 0.000. This indicates that all the independent variables [Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN)] jointly influence the dependent variable {Competitive Advantage (CA)}.

4 Conclusion

This research has presented an insight on the relationship between competitive intelligence and competitive advantage in manufacturing industry, targeting three manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria. By adapting three measures of competitive intelligence in this study has established the influence of Strategic Intelligence (SI), Innovative Intelligence (II) and Human Intelligence Network (HIN) in enhancing Competitive Advantage (CA) in manufacturing industry. The study targeted a sample of 153 respondents out of which 129 respondents gave their responses giving a response rate of 84%. Thus, the sample to be used for the study was the total of one hundred and twenty-nine (129) respondents from staffs in three
manufacturing firms (Wonder Pack Limited, Whictech Aluminium Limited and Flight Aluminium Plc) in Asaba, Delta State, Nigeria. The data presented and analyzed in this study are grouped into categories. The first is the descriptive statistics to describe the trend of movement of the data and correlation matrix was used to ascertain the kind of relationship that exists between the independent and dependent variables. The testing of hypotheses formulated for the study was done using multiple regression analysis with the aid of SPSS version 23. The results of the statistical analysis show that Strategic Intelligence (SI) and Innovative Intelligence (II) were significant in enhancing Competitive Advantage (CA) in manufacturing industry while Human Intelligence Network (HIN) was insignificant in enhancing Competitive Advantage (CA) in manufacturing industry. The results of the study showed that higher levels of competitive advantage depend on competitive intelligence. The study concluded that there is significant relationship between competitive intelligence and competitive advantage in manufacturing industry.

Recommendations

Based on the analysis and findings, the following recommendations are made:

- There should be an adequate investment in competitive intelligence process, facilities, and activities by the manufacturing firm so as to be innovative, in their product, services and competitive dispositions.
- In implementing competitive intelligence in an organization, employees should be equipped with the knowledge, skill and technical know-how of handling intelligence product,
- Adequate resources should be made available for personnel to carry out effective competitive intelligence generation, sharing, distribution and deployment to areas of needs.
References


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