DOES GAME THEORY AMELIORATE CONFLICT MANAGEMENT AND ORGANIZATIONAL PRODUCTIVITY?

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ABSTRACT
The study examines the impact of game theory as a conflict management style on organizational productivity. It adopts a purposive sampling technique. A total of one hundred and sixty copies of questionnaires retrieved from the respondents were used for the analysis. The study applied a multiple regression model technique to establish the effects of conflict management proxies on organizational productivity. Results revealed that with the inclusion of game theory as a conflict management variable, its contributions rose from 39.33% to 48.80%. In addition, the proxies of compromising and accommodating are statistically significant with the presence of game theory. Accordingly, the study concludes that game theory drives organizational productivity. It is therefore recommended that management should apply game theory to manage organizational conflicts.

Keywords: Accommodating, Collaborating, Compromise, Conflict, Game Theory.
INTRODUCTION

Conflict is inevitable and bound to occur the moment interactions exist between people (individuals, groups, or legal people). For instance, the moment an individual gets married, there is a tendency to have a clash of interests in decision-making regarding the number of children to give birth to, what to eat for breakfast, and so on. Thus, organization is not an exception, conflict will always be experienced as far as it is made up of employees, board of directors, and unions having different interest groups that take and implement the decision. Impliedly, an ability for a particular group to protect its interest group, conflict is bound to happen. For instance, employees will continually agitate for more wages and welfare benefits through their various unions, and management, on the hand, will strategize on how to maximize profit for the shareholders by not accepting the demand of the employees to reduce the cost of production.

Conflict is a struggle or contest between people with opposing needs, ideas, beliefs, values, or goals (Akenbor & Nwaeke, 2012). In order for one party to protect their group interest, it will affect the productivity and profitability of the organization (Watson, 2002). However, conflict is not completely bad, as low-level conflict leads to innovation or revolution and increases efficiency and vice-versa. When there is conflict, productivity is likely to increase because most employees would be scared of each other and more dedicated to their work in line with the policies and norms of the organization. Although, a high-level conflict would lead to a loss of resources or a reduction of efficiency in any organization (Leung, 2009; Wang, 2016).

Prior studies had postulated how conflicts could be resolved through compromise, procrastination, arbitration, third-party judgment, joint consultation, reorganization, perfect coexistence, collective bargaining, conciliation, mediation, judiciary procedures, and game theory (Boskey, 1999; Johnne & Nwasike, 2002; Morris, 2010; Akenbor & Nwaeke, 2012; Luz, Nogueira & Lara, 2022; Salami, Orishede & Morka, 2022). Proper management of conflict interests both employees and employers and assures leaders that the organization will succeed (Emerson, 2016; Jordan, Lawrence, & Troth, 2016; Klingel & Maffei, 2016). In the works of Sedina (2016) and Wood (2016), they noted that conflict management, in most cases, is ineffectively managed.

Studies by Schelling, 1980; Cooter and Rubinfeld, 1989; Luz, Nogueira, and Lara, 2022 have established that game theory is the most robust and superior approach to conflict resolution because it deals with the competition of parties, which is one of the compositions of conflict. Thus it is "a mixture of cooperation and competition between parties" Furthermore, Luz, Nogueira, and Lara (2022) noted that "parties that cause conflict has interdependent interests, implying that the outcome of one interested party depends on both their own decisions and decisions by other parties, which game theory studied.

Despite the superiority of the game theory approach over other approaches, very limited studies adopt its application to conflict management. This study asserts that the complications in understanding the mathematical theory of games have made many researchers use other approaches to conflict management. Therefore, this study contributes to the existing extant literature by introducing game theory variables to the conflict management style on organizational productivity.
CONCEPTUAL FRAMEWORK

Game Theory

The theory of games can be credited to Emile Borel, a Mathematician, in 1921. However, it became popular in 1929 in the works of John Von Neuman, who propounded the theory of parlor games. Game theory is built on the premise that every outcome depends on the decisions of two or more autonomous players, and no single decision-maker has complete control over the outcomes (Kelly, 2003).

Game theory "is the mathematical approach used to study conflict and strategy, where choices of one player affect the other." Similarly, it can be used to investigate employees' expressed strategy in an organization. It is a scientific discipline investigating conflict situations and interactions between agents and their decisions (Hotz, 2006). Thus, it uses a mathematical approach by considering rules of behavior that will optimize various outcomes for each player or party, considering utilities and probabilities (Morris, 2010). Game theory comprises players, strategies, and payoff. Bhuiyen (2016) defined game theory as "a theory of rational decision in conflict situations." In the study of Rapoport (1974:1), game theory involve "a set of decision makers (players); a set of strategies available for each player to choose; a set of outcomes (every chosen strategy determine the outcome of the game) and a set of payoffs accorded to, each player in each of the possible outcomes." Furthermore, game theory is a sophisticated mathematical-economic discipline appropriate for analyzing complex decisions to reach favorable outcomes for the individual making the decision or the entire organization (Hrustek, Persi & Klicek, 2020). Bagshaw and Zeb-Obi (2003) "Game theory involves the application of strategies open to both parties that results from a payoff that is advantage and disadvantage to opposing parties."

Previous studies have established the use of game theory to solve problems of war (Bhulyen, 2016); moral and ethical decisions; and conflict resolutions (Geckil & Anderson, 2010). Thus Geckil and Anderson (2010) noted that in applying game theory, the model itself compares the player to always consider the actions of others in the process of choosing the strategy to adopt.

Conflict

Conflicts are bound to happen in any organization as employees come from different backgrounds, personality traits, and work styles to pursue a common goal (Salami, Orishede & Morka, 2022). It arises because of disagreement between two parties caused by a 'mismatch in feelings and goals between them,' which can lead to the breakdown of laws and affects productivity (Prieto-Remon, Cobo-Benita, Oritz-Marcus & Uruburua, 2015). If conflict is not properly managed, it can lead to a strike, which will affect the economy's growth. In Nigeria, the removal of the fuel subsidy announced by President Tinubu caused conflict between the Nigeria Labour Congress (NLC) and the government, which directly affected all sectors of the economy.

Managers with good management skills can avert conflicts in an organization, as they have the requisite knowledge to ascertain and provide a good working environment to the employee (Salami, Orishede & Morka, 2022).

Limited resources are the major causes of competitive conflict, as members or groups now struggle to shortchange each other to benefit from the scarce resources. In addition, studies have established that conflicts arise because of poor communication and lack of trust among people due to interest differences when the employers quest to maximize profits and workers fight for...
improved condition of services (Fajana, 2000); employer's prerogatives and workers' rights and resistance to change (Armstrong, 2009).

Fisher (1990) defined conflict as "an incompatibility of goals or values between two or more parties in a relationship, combined with attempts to control each other and antagonistic feelings toward each other." The South African Concise Oxford Dictionary (2002:242) "Conflict is typically viewed as a form of disagreement or argument, or an incompatibility in the views, opinions, principles and so forth of two or more individuals."

Conflict can be caused by workplace behaviour among staff in the organization. The Dutch National Survey on working conditions (2006) found that "15% of employees have felt intimidated at some time by a boss or colleague, and 25% say they have been intimidated by a client."

**Conflict Management**

The concept of conflict management replaces management scholars' idea of conflict avoidance, believing that conflict cannot be completely avoided because it is bound to happen; however, it can be managed (Abuzaidi et al., 2022). Maureen, Maore, and Were (2021) define conflict management as "the process of identifying and dealing with the conflict in an effective, reasonable, and unbiased way, using problem-solving techniques, effective communication channels, and bargaining skills with an emphasis on the organization's interest. Conflict is unavoidable, and if well managed, it will positively impact organizational productivity and vice-versa (Uchedu, Anijaobi & Odigwe, 2013). Rahim (2002) described conflict management as "designing effective strategies to minimize the dysfunctions of conflict and enhance the constructive functions to optimize learning and effectiveness of an organization."

Previous studies have adopted different conflict management instruments that have failed to produce useful results due to the inability to establish the root cause of the conflict. In managing organizational conflict, the cause of the conflict should be identified, and solutions to accommodate all parties are to be incorporated (Holtzhausen, 1994). In addition, Havenga (2004) noted that "to resolve conflict whether individuals or groups, the sources of the conflict must be determined, as a key element to develop the appropriate conflict resolution" That is an attempt to manage or resolve a conflict without establishing the cause or causes of the conflict is an exercise in futility. Robins (2015) stated that organizational performance will improve if the causes of conflict are identified early and corrected.

In Nigeria, the Trade Union Amendment Degree, 1988, No 39 and Trade Dispute Act CAP 18, 2004 provided internal machinery of grievance procedures, the external machinery by appointing a mediator, National Industrial Court, Industrial arbitration panel, and the constitution of Board of Inquiry, if necessary.

**Organizational Productivity**

Researchers use the terms organizational productivity, effectiveness, efficiency, and performance interchangeably, and its major concerns are what measures the key concepts (Venkatraman & Ramanujam, 2008). Chein (2007) used expert growth, profitability, return on assets (ROA), gross profit, return on equity (ROE), return on investment (ROI), return on sales (ROS), market share, revenue growth, sales growth, stock price, liquidity, and operational efficiency. Thus,
Richard and Wade (2009) noted that no single performance measurement can address all aspects of organizational performance. Performance definition can be measured using efficiency-related measurements such as input-output relationship and effectiveness (business growth and employee satisfaction) (Usendok, 2022), quantitative data (Kottler & Keskett, 2022), financial and non-financial (Venkatraman & Ramanujam, 2008; Kamilah & Shafi, 2016; Tarurhor, Aruoren & Owolabi, 2022), qualitative and quantitative (Neely, Gregory & Patts, 1995).

**LITERATURE REVIEW**

Most people feel that conflict is unhealthy for any organization. This assertion is not entirely the true position. Conflict can also improve organizational productivity if it is low. Robbins (2005) asserted that conflict in an organization can be too low or high, and only the extremely high can affect performance. He argued that when conflict is optimal, the organization will grow, as it will prevent stagnancy, allow tensions to be released, stimulate creativity, and initiate the seeds for the change.

If the proper measure is adopted, conflict resolutions ought to benefit the parties involved. This study suggests that conflict should be resolved the moment it is perceived before it will affect organizational productivity. However, in today's industrial organization, it is observed that the balance of power has been shifted towards the work group as against management previously. That is, work-group in the form of Unions mostly have their way of negotiation (Bagshaw & Zeb-Obi, 2003). Thus, game theory can balance the power between the union and management.

Babin and Boles (2000) established when organizational conflict happens frequently, organizational performance and productivity are grossly affected. Thus, frequent worker agitation for increased welfare allows strike action, directly affecting organizational performance. Similarly, Dijkstra (2006) established that conflicts caused unpleasant emotions that negatively impact work performance and individual well-being. Usendak (2022) finds a statistically significant positive relationship between employee job performance and organization conflict measured by goal differences, common resources, task interdependence, and specification.

Abuzaid, Al-Haraua, and Alateeg (2022) stated that committed staff is productive; their study established that conflict management positively affects employee commitment. In the same vein, Nambozo (2011) found a positive relationship between conflict resolution and employee commitment. In the study of Ojo and Abolade (2014), effective conflict management improved employees' performance and was statistically significant to employees' commitment. Furthermore, Akhtar and Hassan (2021) asserted that the conflict management styles of obliging, integrating, and compromising are positively and statistically significant to organizational commitment.

Arising from the above discussions, the study is hypothesized as follows: Conflict management has a positive effect on organizational productivity.
METHODS

A purposive sampling technique was adopted, as individuals (staff) used as respondents have the requisite knowledge of conflict management and organization productivity (Light, Singer & Willett, 1990, Tarurhor & Temile, 2020), and the total population is one hundred and eighty, which is inadequately to apply a sample size technique (Banerjee & Chaudhury, 2019; Kothari & Garg, 2014; Tarurhor & Tarurhor, 2022). Questionnaires on game theory awareness were modified from the study of Kostelic (2021), and other measurements of conflict management were adopted from the works of Reginald (Reg) Adkins in 2006. The study uses analytical and descriptive research methods to test whether game theory ameliorates the relationship between conflict management and organizational productivity. A total of one hundred and sixty-nine questionnaires used for this analysis were retrieved from the respondents out of the one hundred and eighty distributed.

Model Specification

The study adopts a multiple regression technique to establish the relationship between the effects of the proxies of conflict management on organizational productivity.

\[
\text{orp} = \text{f}(\text{col, com, avd, acc, cop, gam})
\]

\[
\text{orp} = \beta_0 + \beta_1 \text{col} + \beta_2 \text{com} + \beta_3 \text{avd} + \beta_4 \text{acc} + \beta_5 \text{cop} + \beta_6 \text{gam} + \epsilon_t
\]

Where:

- orp = Organizational productivity
- col = Collaborating
- com = Competing
- avd = Avoiding
- acc = Accommodating
- cop = Compromising
- gam = Game Theory
- \(\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6\) = Regression coefficients
- \(\epsilon_t\) = Error term

Figure 1: Conceptual Framework.
cop = Compromising
gam = Game theory

2 Collaborating: Aylward (2013) and Pellington (2014) stated that collaborating includes conflict situations and longing to meet the concerns of many engaged fully.
3 Competing: It occurs when the employee needs the resources and programs of the organization to fulfill his demands without caring about the interests of the other individuals in the organization (Abuzaid, Al-Harais & Alaleeq, 2022)
4 Avoiding: It occurs when the employee discovers a conflict and selects to withdraw from the conflict situation (Pellington, 2014)
5 Accommodating: It occurs when the employee needs to maintain a relationship, so s/he is putting other employee's interests over his particular interest (Aylward, 2013)
6 Compromising: It occurs the positions where every employee will cease to resist an opponent (Aylward, 2013)
7 Game theory: The choice of one player affects the other.

RESULTS AND DISCUSSIONS
The variable description in Table 1, having a maximum of 4 and a minimum of 1, confirms that there are no outliers as the Likert scale ranges from 1 to 4 (Tarurhor and Aruoren, 2023). This implies that the staff at Delta state university adopts more collaboration and accommodation, as shown by having a maximum of 4 and game theory 1 being the minimum. This response to game theory confirmed that most respondents are not used to game theory as a conflict management style.

Standard deviation values range from 0.2552937 for compromising to 0.5885546 for competing, whose values are less than one (1). It implies that the respondents have close opinions regarding questions, and therefore, the mean values used for the analysis are reliable for this study.

Table 1
Descriptive Analysis

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Orp</th>
<th>Col</th>
<th>Com</th>
<th>Avd</th>
<th>Acc</th>
<th>Cop</th>
<th>Gam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.95069</td>
<td>3.349112</td>
<td>1.913215</td>
<td>2.566075</td>
<td>2.844181</td>
<td>2.402367</td>
<td>2.230769</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>.373831</td>
<td>.577133</td>
<td>.2552937</td>
<td>.3980853</td>
<td>.5540084</td>
<td>.5885546</td>
<td>.5610836</td>
</tr>
<tr>
<td>Maximum</td>
<td>3.666667</td>
<td>4</td>
<td>3.333333</td>
<td>3.666667</td>
<td>4</td>
<td>3.333333</td>
<td>3.333333</td>
</tr>
<tr>
<td>Minimum</td>
<td>2.333333</td>
<td>2</td>
<td>1.666667</td>
<td>1.666667</td>
<td>2</td>
<td>1.333333</td>
<td>1</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.0010</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0095</td>
<td>0.4874</td>
<td>0.0003</td>
<td>0.5732</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.0001</td>
<td>0.2667</td>
<td>0.0000</td>
<td>0.0924</td>
<td>0.0185</td>
<td>0.0716</td>
<td>0.0260</td>
</tr>
<tr>
<td>N</td>
<td>169</td>
<td>169</td>
<td>169</td>
<td>169</td>
<td>169</td>
<td>169</td>
<td>169</td>
</tr>
</tbody>
</table>

Source: Author’s Computation.

Furthermore, the skewness and kurtosis values certify that the data are normally distributed as none of the values are more than 1; it ranges from 0.0000 to 0.5732, as shown in Table 1.

Table 2
Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Col</th>
<th>Com</th>
<th>Avd</th>
<th>Acc</th>
<th>Cop</th>
<th>Gam</th>
<th>Orp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Com</td>
<td>0.0318</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avd</td>
<td>0.0357</td>
<td>-0.799</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acc</td>
<td>0.4980</td>
<td>-0.1570</td>
<td>0.6962</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cop</td>
<td>0.0104</td>
<td>0.5683</td>
<td>-0.1706</td>
<td>-0.0236</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gam</td>
<td>-0.0848</td>
<td>-0.2380</td>
<td>0.5517</td>
<td>0.3717</td>
<td>0.0476</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Orp</td>
<td>0.0741</td>
<td>-0.2877</td>
<td>-0.3757</td>
<td>-0.2992</td>
<td>-0.4293</td>
<td>-0.4941</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Source: Author’s Computation
Table 2 shows a negative relationship exists between organizational productivity and the proxies of conflict management, except for collaborating (0.0741), reporting a positive relationship. Their values range from -0.4941 to 0.5683, indicating that multicollinearity is nonexistent as they are less than 0.70 (Dimitrios & Hall, 2015; Tarurhor & Olele, 2020).
Conflict management proxies of competing, avoiding, accommodating, compromising, and game theory have adverse and statistically significant effects on organizational productivity, except avoiding, which is insignificant as the P-value is 0.710, as shown in the regression results in Table 3. These findings support the works of Sedina (2016) and Wood (2016) that if a conflict is ineffectively managed, it will adversely impact organizational productivity.
However, the impact of collaborating on organizational productivity is positively and statistically significant (coef: 0.116504, P=0.021).

### Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Com</th>
<th>Avd</th>
<th>Acc</th>
<th>Cop</th>
<th>Gam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>0.116504</td>
<td>-0.4216531</td>
<td>-0.0385196</td>
<td>-0.1731319</td>
<td>-0.1656219</td>
<td>-0.2777863</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.5063</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj R-Squared</td>
<td>0.4880</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-Statistics</td>
<td>F(6,162)=27.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-Statistics</td>
<td>2.33</td>
<td>-3.60</td>
<td>-0.37</td>
<td>-2.27</td>
<td>-3.29</td>
<td>-5.58</td>
</tr>
<tr>
<td>P-Statistics</td>
<td>0.021</td>
<td>0.000</td>
<td>0.710</td>
<td>0.025</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Author's Computation

In addition, the regression result also shows that conflict management can account for 48.80% of organizational productivity, implying that 51.20% is accounted for by other variables not captured in this study.

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Com</th>
<th>Avd</th>
<th>Acc</th>
<th>Cop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>0.1195744</td>
<td>-0.1488173</td>
<td>-0.3174403</td>
<td>-0.1228056</td>
<td>-0.2765854</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.4113</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj R-Squared</td>
<td>0.3933</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-Statistics</td>
<td>F(5,162)=22.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-Statistics</td>
<td>2.30</td>
<td>-1.28</td>
<td>-3.22</td>
<td>-1.49</td>
<td>-5.50</td>
</tr>
<tr>
<td>P-Statistics</td>
<td>0.029</td>
<td>0.201</td>
<td>0.002</td>
<td>0.138</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Author's Computation

The study observed that the absence of game theory data in Table 4 reduces the adjusted R-Squared from 48.80% to 39.33% as contributions to organizational productivity. In the same vein, conflict management variables of compromise and accommodating are no longer statistically significant because of the importance of game theory's role in conflict management.

CONCLUSION

This study has increased the literature by including the variable of game theory to conflict management styles and justifying its usefulness. The findings established that conflict management's proxies by competing, avoiding, accommodating, compromising, and game theory have a negative impact on organizational productivity. In contrast, collaborating reports a positive relationship with organizational productivity.
When game theory was excluded from the conflict management, the adjusted R-Squared reduced from 48.80% to 39.33%, and compromise and accommodating, initially statistically significant in Table 3, became not statistically significant (P = 0.201 and 0.138), respectively. The study concludes that the management of Delta State University should train staff on the importance of game theory and apply it to manage their conflicts.

References


