THE EFFECTS OF ORGANIZATIONAL FACTORS ON PERFORMANCE OF VERTICAL INTEGRATION

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Abstract - In order to compete in highly competitive environment, organizations strive to develop strategies and increase their performance via creating capability of timely and precise delivery of products and services. That is to say, managers try to satisfy their customers, which create more profitability for stockholders. In connection to this, a decision making of organizational factors and the relationships with vertical integration performance plays a crucial role in accomplishing results, to realize the firm's goals. A questionnaire was constructed and conditioned response by 14 experts. Then the DEMATEL (Decision Making Trial and Evaluation Laboratory) technique was performed to analyze the criteria and the criteria were also constructed. The DEMATEL is an implement, which not merely can transform the relationships among cause and effect criteria into a seeing structural framework, and the methods can also be implied as a technique to manage the contingencies underlying a set of criteria. The study presents the significance of research persists an important findings based on DEMATEL approach to assist managers evaluate the relationships on organizational factors and performance of vertical integration.

Keywords - DEMATEL, Organization, Performance, Vertical Integration

I. INTRODUCTION

1.1. Research Background and Motivation

Indeed, from a development perspective entrepreneurship has recently come to be seen as a viable alternative to petrochemical industry in Taiwan. The oil industry has been ground for an analysis of the cause and effects of vertical integration (Barrera-Rey, 1995).

Organizational structure is partly affected by the firm’s external environment (Bourgeois et al., 1978). As environments change rapidly, there is increasing competition to provide innovative products and services, changing globalization are regarded as having become the standard backdrop for firms (Waiganjo et al., 2012). Firm’s performance is organization activity achieves goals of the organization (Abu-Jarard et al., 2010). Daft (2000) also described that organizational performance is the firm’s capability to realizing its goals.

In terms of management, vertical integration (VI) has been driven by enterprises that have been engrossed in exploration and elicitation of crude petroleum and settled to have come by a series of downstream refineries and a wide distribution market share (Andreou et al., 2015). Vertical integration is a strategy which is one of the higher attentions when petrochemical industry developing corporate level strategy. The strategy was exceedingly successful in resolving the problem of slow sales of PVC resins. Therefore, the search for competitive advantage has long been a central object of the field of strategic management (Armstrong, 2009).

With the continued fraction expansions of Formosa Plastics Group (FPG) and evolution of new businesses, a tertiary processing industry was created, with no rival in the world. This led to the advantageous evolution of the local petrochemical industry and contributed remarkably to the economic evolution of Taiwan. The self-sufficiency rate of ethylene increased from 38% in 1994 to over 100% in 2014. Annual production value in 2014 has reached US$50 billion (Economic contributions, 2014). However, FPG’s productive capabilities of VI are serious complexity, even Stuckey and White (1993) reported that VI is a risky strategy, which is complex and hard to reverse. Jacobides and Hitt (2005) argued that productive capabilities may be utilized better by using both vertical integration and the non-vertically integrated governance mode that the distribution of productive performance. It was such in an effort to address value chain related problems among other goals (Andreou et al., 2015).

Therefore, on this basis vertical integration should contribute to integration and coordination in industrial value chain, which enterprises such as FPG how to integrate and control every step involved in bringing oil from exploration refinement to the end product of consumers.

1.2. Research purpose

The purpose of this study is to examine the possible mediating impact of organizational structure, organizational culture and organizational strategy on the product market, financial, communication and shareholder return, which are the most important factors for evaluating of vertical integration performance.

1.3. Research scope and limitations

An empirical study in FPG, one of the biggest Taiwan makers, is illustrated. One of FPG mission is to
II. LITERATURE REVIEW

PERFORMANCE OF VERTICAL INTEGRATION (POVI)

For the enterprise as a whole, change action is positively impact on organizational performance, and its decision-making will be affected firms (Ndahiro et al., 2015). The firm’s performance can be described as the benefits derived from the firm’s shares by the shareholders (Rouf, 2011). In addition, Richard et al. (2009) also show that firm’s performance encompasses three specific areas of firm outcomes: financial performance; product market performance; and shareholder return. Furthermore, the main factors for evaluation of vertical integration performance categorized into three groups of economical, communicational and product performances, which might have the most consistent strategy to achieve higher criteria (Carmeli et al., 2010).

Vertical integration (VI) is usually viewed as the extent to which a firm controls the production of its inputs or supplies and the distribution of its outputs or finished products (Fernandes and Tang, 2012). What is more, Ghana (2014) argued that the ability of senior management teams to implement firm’s performance involves financial performance, products, market solutions, and performance management. On the petrochemical industry ecology, Formosa Plastics Group (FPG), such as integrated upstream and downstream groups have more profit margins, the upper reaches of the light oil is responsible for cracking, downstream reaches of products. Therefore, to improve the ability to judge the performance of the organization, more members, including those of the organizational structure and the organization’s distribution channels, must be involved in broad communication and obtain more evidence of valuable performance (Ghana, 2014).

2.1. Organizational Structure

Organizational structure can provide better understanding about organization philosophy and the way that organization is established. Zheng, et al. (2010) noted that the most important components of organizational structure include centralization, and control. Lim et al. (2010) proposed that organizational structure development is dependent on the management strategies and behavior of the members as restricted by their outcome. The meaningful impact of organizational structure on a firm should be measured in terms of the relationship with the firm’s effective performance (Tran and Tian, 2013).

2.2. Organizational Culture

Tyrrell (2000) described that organizational culture is always treated as a negotiation because it is an emerging asset of human interaction. Hence, the beliefs of the members of the organization in the conduct of negotiations and practice have become a reference (Kusluvan & Karamustafa, 2003). Organizational culture is reflected important factors for the founders whom they are responsible for the vision and objectives of the organization, and opinions via behavior (Scheres & Rhodes, 2006). Organizational culture is also manifested through member dialogue and behavior as well as organizational practices (Schein, 1985).

2.3. Organizational strategy

Strategies to enhance performance in business organizations are of great importance to organizational leaders in today’s business environment (Ajagbe et al., 2016). In a highly competitive world, companies need to reduce costs and improve quality in order to execute their strategy in business (Cooper, 1995). Organizational strategies characterized by conservative orientations, can be properly served by performance management systems based on centralized control of firms (Chenhall, 2003).

III. EVALUATION METHOD

The Battelle Memorial Institute conducted a DEMATEL method via its Geneva Research Center (Gabus & Fontela, 1973).

3.1. The DEMATEL

This paper applies the DEMATEL method to refine the version used by Fontela and Gabus (1976) and provides the following steps.

Step 1: Built the direct-relation matrix, First, measure four levels: 0 (no influence), 1 (very low influence), 2 (low influence), 3 (very high influence) and 4 (very high influence). As a result, the direct-relation matrix, which is an n×n matrix A, in which aij is denoted as the degree in which the i influences the j.

Step 2: Normalize the direct-relation matrix based on the direct-relation matrix A, the normalized direct-relation matrix X will gained via formulas:

\[
X = k \cdot A
\]

\[
k = \frac{1}{\max_{i,j} \sum_{i,j} a_{ij}}
\]

Step 3: Gain the total-relation matrix, once the normalized direct-relation matrix X is calculated, the total relation matrix T be obtained, in which I is identity matrix.

\[
T = X(I - X)^{-1}
\]

Step 4: To express the structural relationship among the criteria of cause and effect and keep the complexity of the system to a manageable level (Tzeng et al., 2007).

3.2. Data analysis

<table>
<thead>
<tr>
<th>Table 1 - Normalized Direct-Relation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1</td>
</tr>
<tr>
<td>Z1 0.180</td>
</tr>
<tr>
<td>Z2 0.180</td>
</tr>
<tr>
<td>Z3 0.180</td>
</tr>
<tr>
<td>Z4 0.154</td>
</tr>
<tr>
<td>Z5 0.125</td>
</tr>
<tr>
<td>Z6 0.107</td>
</tr>
<tr>
<td>Z7 0.103</td>
</tr>
</tbody>
</table>

Table 2 - (Total Relation Matrix)

<table>
<thead>
<tr>
<th>Z1</th>
<th>Z2</th>
<th>Z3</th>
<th>Z4</th>
<th>Z5</th>
<th>Z6</th>
<th>Z7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 0.409</td>
<td>0.615</td>
<td>0.586</td>
<td>0.489</td>
<td>0.388</td>
<td>0.353</td>
<td>0.301</td>
</tr>
<tr>
<td>Z2 0.540</td>
<td>0.430</td>
<td>0.565</td>
<td>0.454</td>
<td>0.356</td>
<td>0.353</td>
<td>0.274</td>
</tr>
<tr>
<td>Z3 0.540</td>
<td>0.583</td>
<td>0.416</td>
<td>0.454</td>
<td>0.360</td>
<td>0.330</td>
<td>0.292</td>
</tr>
<tr>
<td>Z4 0.501</td>
<td>0.544</td>
<td>0.533</td>
<td>0.319</td>
<td>0.324</td>
<td>0.325</td>
<td>0.271</td>
</tr>
<tr>
<td>Z5 0.484</td>
<td>0.543</td>
<td>0.546</td>
<td>0.417</td>
<td>0.266</td>
<td>0.330</td>
<td>0.288</td>
</tr>
<tr>
<td>Z6 0.438</td>
<td>0.516</td>
<td>0.480</td>
<td>0.399</td>
<td>0.309</td>
<td>0.225</td>
<td>0.264</td>
</tr>
<tr>
<td>Z7 0.448</td>
<td>0.537</td>
<td>0.509</td>
<td>0.405</td>
<td>0.322</td>
<td>0.318</td>
<td>0.197</td>
</tr>
</tbody>
</table>

The ranking for affection based on Table 2 is presented in Table 3.

Table 3 - The Ranking of Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>R (sum)</th>
<th>D(sum)</th>
<th>R+D</th>
<th>R-D</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 3.142</td>
<td>3.359</td>
<td>6.501</td>
<td>-0.217L</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Z2 2.971</td>
<td>3.769</td>
<td>6.740</td>
<td>-0.798</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Z3 2.975</td>
<td>3.635</td>
<td>6.610</td>
<td>-0.660</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Z4 2.818</td>
<td>2.937</td>
<td>5.755</td>
<td>-0.119L</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Z5 2.873</td>
<td>2.326</td>
<td>5.199h</td>
<td>0.547h</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Z6 2.632</td>
<td>2.234</td>
<td>4.866L</td>
<td>0.398h</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Z7 2.736</td>
<td>1.887</td>
<td>4.623h</td>
<td>0.849h</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Relation (R-D) and prominence (R+D) were used for classification. A description is provided in Table 3.

(1) High relation, high prominence: namely (Z7) Organizational Structure and (Z5) Organizational Culture. These attributes are the cause attributes which are core items influencing the other attributes.
(2) High relation, low prominence: namely (Z6) Organizational Strategy. The attribute influenced certain other attributes, to a relatively low degree cannot be directly improved.
(3) Low relation, high prominence: namely (Z2) Shareholder Return and (Z3) Broad Communication. These criteria are the effect attributes, which are influenced by other attributes.
(4) Low relation, low prominence: namely (Z1) Product Market and (Z4) Financial performance. These criteria are slightly influenced by other criteria, indicating that they are relatively independent.

CONCLUSIONS

Vertical integration can be used to improve the competitiveness of enterprises. The improvement of vertical integration is resulted in competitive advantage of firms. The results provide strongly and convincing evidence as well as strategic advice for petrochemical industry how to align internal variables, which is organizational structures, organizational culture and organizational strategy of the vertical integration management.

In this paper, the results showed that among the causes, organizational structure, organizational culture and organizational strategies achieved the highest R-D value. Also, shareholder return and broad communication have the lowest R-D value, which means that these factors are mostly influenced by other factors. Base on R-D value, organizational structure, organizational culture and organizational strategies, respectively were considered as cause factors and financial, product market, broad communication and shareholder return were effect factors. The identification of the causal factors in this study of organizational factors can be applied as performance for vertical integration in petrochemical industries for applicable strategies.
REFERENCES


