“DEVELOPING NPD PROCESS CAPABILITIES THROUGH OPEN INNOVATION”

Author: Sanaz Monsef-PhD-Candidate- Faculty of Management and Human Resource Development (FPPSM) Universiti Teknologi Malaysia (UTM)

Abstract
New product development could be recognized as a key factor to success in an increasingly competitive, global economy. The purpose of this paper is to examine how open innovation improves new product development process capabilities. Studies have indicated that open innovation is considered an appropriate means to improve the success of new product development, but it is important to achieve a high level of NPD process capabilities. In this study, we explore the relationship between open innovation paradigm and NPD process capabilities, including, planning capability, development capability, marketing capability, and commercialization capability. Moreover, the study also aims to recommend the appropriate model by looking at the role of organizational structure (formalization, centralization, and complexity) factors. In these relationships, based on the objectives, the focus is on the influence of open innovation on new product development process capabilities with consideration to the role of organizational structure dimensions.

Keywords
Product development process, Organization, moderating role, capability

1. Introduction

New product development has received a great deal of attention in strategy literature, and serves as a means to improve the overall performance of a firm (Cavusgil et al., 2003; Vorhies and Morgan, 2005). Today, organizations are faced with the rapid growth of technology, so they can obtain new technology development through internal venturing (McGrath and MacMillan, 2000). Therefore, with the increasing complexity of technology, companies should select an appropriate strategy for scanning and selecting ideas and technology from inside and outside the environment of an organization. In this regard, Chesbrough (2003) pointed to open innovation as a paradigm that helps companies in terms of combining internal and external sources for developing new products and technology flexibility. Open innovation paradigm allows companies to use outside ideas, and allows others to use the company's internal ideas (Helfat, 2006). In addition, open innovation transcends using customers, rivals, and universities as sources of innovation (West and O’mahony, 2008). This pattern of innovation has paid attention to knowledge value that is outside of a company’s walls, where ideas can both flow inwardly through the walls of the organization as well as outwardly. In this regard, organizational factors play the important roles of utilizing open innovation paradigm suggesting ways of improving product development process (Calantone et al., 1993; Li and Calantone, 1998; Rindfleisch and Moorman, 2001). Additionally, these factors are very significant to obtaining a competitive advantage for companies (Droge et al., 2008). One key point is that the dimensions of organizational structure have an indirectly effect on NPD’s success (Droge et al., 2008; Bahemia and Squire, 2010a). Thus, these concepts show that the dimensions of organizational structure are influential factors in relation to open innovation and NPD process in company (Jones, 2007).

Thus, this paper reveals the relationship between open innovation and NPD process in companies. In addition, this study sets out to provide a better understanding of the role organization structural factors in relation to the open innovation paradigm and new product development process capabilities.
2. Conceptual Framework

According to the findings from the comprehensive review of existing reference in the literature of new product development process, open innovation, and organizational structure dimensions, a conceptual model has been designed, as presented in Figure 1.

Figure 1: Conceptual Model

In this regard, the proposed model illustrates that open innovation is the independent variable and new product development process capabilities is the dependent variable, both of which are dealt with in this research.

2.1 Variables

2.1.1 Dependent variable: NEW PRODUCT DEVELOPMENT PROCESS CAPABILITIES

NPD process approaches are related to improving knowledge and understanding of the processes which support the planning, development, marketing and commercialization stages (Bessant and Francis, 1997; Trott, 2008). Process capability is the range over which the natural variation of the process occurs as determined by the system of common causes. Process capability is also the ability of the combination of people, machines, methods, materials, and measurements to produce a product that will consistently meet the design requirements or customer expectation (Dutta et al., 1999). By the same token, Khalil (2000) introduced planning, development, marketing and commercialization as the four original stages of the NPD process (Khalil 2000). Table 1 shows the operational definition of these stages that are used in this study.

<table>
<thead>
<tr>
<th>NPD process stages</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Capability</td>
<td>The degree of efficiency and accuracy of planning on time and price NPD needs, formulating goals and strategies and screening new ideas.</td>
</tr>
<tr>
<td>Development capability</td>
<td>The degree of efficiency and accuracy of showing superiority in assessing needs, market potential, design and manufacturing of new products and understanding the factors that influence the development stage</td>
</tr>
<tr>
<td>Marketing Capability</td>
<td>The degree of efficiency and accuracy of preliminary assessment of the market, competitive analysis, market opportunities analysis and identifying customers’ needs.</td>
</tr>
<tr>
<td>Commercialization capability</td>
<td>The degree of ability to introduce new products to market and provide access to distribution networks and identifying resources in commercialization of new products.</td>
</tr>
</tbody>
</table>
2.1.2 Independent variable: OPEN INNOVATION

The study's independent variable is open innovation. This paradigm helps companies open their walls to obtain external sources during the innovation process (Martinich, 2005; Minshall et al., 2010). It is also an expression that is promoted by Henry Chesbrough in 2003; this concept deals with utilizing external ideas as well as internal ideas in a company (Chesbrough, 2003a). An open innovation must pay attention to sources outside the walls of the company to be used inside, while also considering the outside for the commercialization of internal ideas (Martinich, 2005; Spithoven et al., 2011). Figure 2, shows aspects of open innovation.

Figure 2 : Open innovation Model (Chesbrough, 2003b)

As a result, open innovation point out the significance of communities and relation with other networks in the innovation process. In other words, open innovation approach is an opportunity to provide innovative diffusion and flexible strategies to gain the client’s acceptance and create the industry standard (West and Lakhani, 2008). In this study, open innovation will be operationalized as the degree to which firms connect to the external environment and use external sources, in addition to being considered an influential factor in NPD process capabilities.

2.1.3 Moderator variables Organizational Structure

Organizational structure is defined as the roles, responsibilities and authority of staff, and is a major determinant of information flow in different levels of organization (Dayan and Di Benedetto, 2010; Daft and Lewin, 2008).

Structural dimensions are related to the internal characteristics of an organization. In this regard, Daft (2001) provided a list of structural dimension, of which centralization, formalization and complexity are three factors of organizational structure dimension that have received more attention in previous research pertaining to organization structure factors than have other factors (Anderson, 1999; Aiken and Hage, 1971; Dewar and Werbel, 1979; Ettlie et al., 1984; Pierce and Delbecq, 1977; Daft, 2001; Kanter, 2003; Simon, 1962; Bækgård, 2011; Chiu and Chang, 2009; Hall and Haas, 1967). The operational definition of these factors is explained in Table 2.
Table 2: Organizational structure dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definitions</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>The degree of activities or subsystems in an organization that measure 3 dimensions: vertical, horizontal and spatial</td>
<td>Daft (2008), Anderson (1999), Simon (1962), Hall (1967), Bækgaard (2011), Chiu and Chang (2009)</td>
</tr>
</tbody>
</table>

Hence, according to conceptual model, there are selected three variables; Formalization, Centralization, and Complexity. These are from the structure dimension as effective variables on the relation of open innovation and NPD process capabilities. Therefore, after the brief literature review of the conceptual framework, the methodology will be described in the following section.

3. METHODOLOGY

In this study, a quantitative approach is used to answer the research questions. In this regard, the reasons for the use of a quantitative approach are as follows: first most of the research dealing with open innovation, NPD and structural factors has used a quantitative method. In addition, it is argued that quantitative research is a significant approach in this field for obtaining numerical data (Grönlund et al., 2010; Shankar et al., 2009; Chang, 2008; Ayers et al., 2011; Griffin and Page, 1996). Thus, in this research, a questionnaire is used as the instrument for data collection. The purpose of the questionnaire in this study was to measure and evaluate the variables according to a standard structure. For this reason, initially, a questionnaire was developed which took into account all the variables mentioned in the literature review. The instrument was subsequently developed and estimated by academic experts and managers who were familiar with the NPD process, such as R&D managers. After the instrument validation, the questionnaire was reformed and ready to collect data.

4. CONCLUSION

Many studies have been conducted on new product development, but they did not pay any attention to the capability of the four stages of the NPD process. Moreover, it is highly likely that no previous study had tried to mention open innovation as the impact factor on new product development process. Thus, based on the systematic literature reviews, it is possible to design the organizational structure factors that complete the model. This study is an attempt to provide a detailed analysis on the relationship between open innovation and new product development process capabilities; this relationship is moderated by three factors of organizational structure. This synthesis model may be used to provide a better understanding of open innovation that contributes to an explanation of the NPD process. Furthermore, the result will provide an attractive paradigm for researchers and managers.
REFERENCES

Chang, H. C. (2008). Managing new product development-exploring the relationships between organisational knowledge structure and knowledge conversion under the moderating effect of strategy.
Li, T. and Calantone, R. J. (1998). The impact of market knowledge competence on new product advantage: conceptualization and empirical...