Do Technological Innovation Capabilities Contribute to New Product Development Performance? A Conceptual Framework

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Abstract. Action on innovation is now a trend in the business world. It happens because the business world requires companies to be innovative in order to have competitiveness. Thus, the action of innovation is the result of organizational policy. Organizational policy governs the process of innovation action. The organization's internal capabilities in conducting innovation formulations are called technological innovation capabilities. On the other hand the product is downstream from a business process. Company competitiveness can be seen from the scale where the product can be accepted by the market or not. On a smaller scale, the performance of a product can be seen as the scale of the product business design and how the product is compared to existing competitors. In this paper a conceptual process of analyzing the effects and contributions of Technological Innovation Capabilities (TIC) on the Performance of New Product Development (NPD) will be presented. Modeling variable relationships in TIC and Performance of NPD is important as a basis for strengthening business organization strategy when designing new products to face future markets.

Keywords: Innovation, technological innovation capabilities, new product development, performance, strategy.

1. Background

There are two main issues in the business world today, namely globalization of the world and rapid changes in technology. These two main issues play a role in encouraging a country to be more competitive [1].

The process of innovation from the internal organization is a must. Innovation is a place where every activity of the process of renewal in the organization and becomes the foundation for determining the organization's strategy in competing to remain competitive [2]. The paradigm of innovation requires business organizations to try to meet and have innovation capabilities. Thus, business organizations must realize that innovation capability is a strategic need and deliver it to all business lines that innovation is a key factor to compete in the market. Innovation is the foundation for companies to perform [3].

Chaudhry and Verma [2] mentioned two main sources of companies to innovate. Innovation based on human resources and the ability to develop technology. In the business context, the combination of these two capabilities can have a significant impact on the performance of business organizations.

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In the concept of knowledge-based economics, Technological Innovation Capabilities (TIC) are considered as the main factors in achieving the company's competitive ability [4]. TIC is defined as all the potential of an organization to be able to produce competitive advantage over its competitors in the context of modernism. The potential in question can be in the form of a new product development process, technology mastery and other advancements that can impact on the competitiveness of the company [5]. TIC can also be in the form of the company's ability to improve technological innovation to create value for customers through new products and services, exploitation of new technologies and exploitation of new skills and competencies [2]. In the context of the country, TIC is considered as the main driver of a country in order to achieve competitiveness and long-term economic development [1].

In a smaller context, products are downstream of a business process. Micro competitiveness of companies can be seen from the performance of their products. Companies are required to be able to produce products that can be delivered by the market. New Product Development (NDP) usually emphasizes market share for sustainable business success. It is expected that NDP can contribute to the structure of corporate profits and have an impact on company growth, profit performance and future business planning [6], [7].

This paper presents a conceptual framework for analyzing the effects and contributing components of Technological Innovation Capabilities (TIC) on the Performance of New Product Development (NPD).

2. Literature review

2.1 Technological Innovation Capabilities (TIC)

Technological Innovation Capabilities (TIC) are combinations of knowledge techniques and management skills [8]. Thus TIC is a way in which an organization is able to profit commercially from the diffusion process and application of its technology in order to have competitiveness power compared to its competitors [9].

Yam et al [10] in his paper tried to find a correlation between TIC and firm performance in Chinese companies. It was found that R & D capability dominates the scale of interest compared to other capacities for the science-oriented innovation system. While organizations that have a tendency for market-oriented innovation systems make organizational capability is a priority scale.

Recent research has confirmed that TIC is very important for companies especially for increasing competitiveness [11]–[14]. Other researchers emphasize that innovation is an interactive process in terms of exploiting technological advantages between systems in a business organization [15]. Prajogo and Ahmed [16] emphasize that one of the R & Ds and mastery of technology is the source of innovation processes in companies. While the innovation process in a business organization cannot just happen. Strategic stimulus is needed to be able to encourage the innovation process to occur [17].

2.2 New Product Development (NPD)

The output of all business activities of a company in gaining profit is the product. New products will be issued in a certain period of time by the company in response to the customer's needs. The new value of the product launched will be the customer's critical point of the new product development process (NPD). The existence of new products is very possible to be able to influence the perception of prospective customers in the future [18].

In the beginning, NPD emphasized the process of introducing these products on the market for the sustainability of the company's business success. Thus NPD performance will contribute directly to the company's profit structure and have an impact on company growth, profit performance and future business planning [6], [7].

The performance of the New Product Development appeals to many scholars to study related to the value of product novelty. The new value of this product will be captured by the customer and provides a perception of the benefits to the customer. Product newness on new products will have a widespread impact on the success of sales and market control in the future [19].

3. Hypotheses & Conceptual Framework

3.1 Hypotheses

Some studies categorize the scale of TIC measurement into seven dimensions of measurement [8], [11]. These dimensions are explained as follows:

a. Learning ability is the ability to identify, assimilate, and exploit new knowledge for the firm's competitive advantage.
b. R&D capability refers to the firm's ability to integrate R&D strategies, project implementation, project portfolio management, and R&D expenditures in the context of how this competency can be a competitiveness advantage.
c. Resource Allocation Capability refers to the ability of a firm to ensure adequacy of technology, professional, and financial aspect in the innovation process.
d. Manufacturing Capability refers to the ability of a firm to convert R&D results into products, which meet market orientations, according to design requirements and can also be produced in batches.
e. Marketing Capability refers to the ability to publicize and sell the products based on understanding current and future customer needs, competition circumstances, customer perception of cost & benefit and the customer adoption of innovation.
f. Organizing ability refers to the ability to design relevant organizational structures, foster organizational culture, coordinate all work into various activities towards shared goals, leadership abilities and adopt good practical management.
g. Strategic Planning Capability to the ability to identify internal strengths and weaknesses as well as external opportunities and threats, adopting various types of strategies in the very quickly and competitively changing environment into the competitive advantage of the firm.

In research in the field of innovation, there are 2 attention output innovations that are widely discussed by researchers. The first is related to product innovation and the second is related to the innovation of the production process. However, product innovation in general is more attractive to

researchers compared to the innovation of the production process. This is because product innovation is more considered to be able to provide market dynamics and impact customer value on the novelty of the product [17]. Relatively newer products are considered to have an impact on increasing sales because they have better value than existing products offered by competitors in the market [20].

Strategically, the company will carry out an objective design of new products that will be developed before the new product will be launched. Some measurement aspects of the objectives of NPD developed by researchers include the achievement of market share objectives, customer sales and usage, sales growth, company profits and product performance goals [21], [22].

Therefore some hypotheses can be made as follow:

H1: Learning Capability is positively related to NPD Performance as Business Objectives.
H2: R&D Capability is positively related to NPD Performance as Business Objectives.
H3: Resource Allocation Capability is positively related to NPD Performance as Business Objectives.
H4: Manufacturing Capability is positively related to NPD Performance as Business Objectives.
H5: Marketing Capability is positively related to NPD Performance as Business Objectives.
H6: Organizing Capability is positively related to NPD Performance as Business Objectives.
H7: Strategic Planning Capability is positively related to NPD Performance as Business Objectives.

Researchers also pay attention to the scale of competition for NPD-related competitors. Along with the competition that occurs, competition to reach the market will be increasingly stringent and competitive [23]. The performance scale of new products can be designed for new products programmed to be more successful, development cycle time shorter and better quality [24].

Therefore some hypotheses can be made as follow:

H8: Learning Capability is positively related to NPD Performance Compare to Competitor.
H9: R&D Capability is positively related to NPD Performance Compare to Competitor.
H10: Resource Allocation Capability is positively related to NPD Performance Compare to Competitor.
H11: Manufacturing Capability is positively related to NPD Performance Compare to Competitor.
H12: Marketing Capability is positively related to NPD Performance Compare to Competitor.
H13: Organizing Capability is positively related to NPD Performance Compare to Competitor.
H14: Strategic Planning Capability is positively related to NPD Performance Compare to Competitor.

3.2 Conceptual Framework

Based on the results of literature review and hypotheses to be tested then in this study developed conceptual framework model as follows Fig. 1.

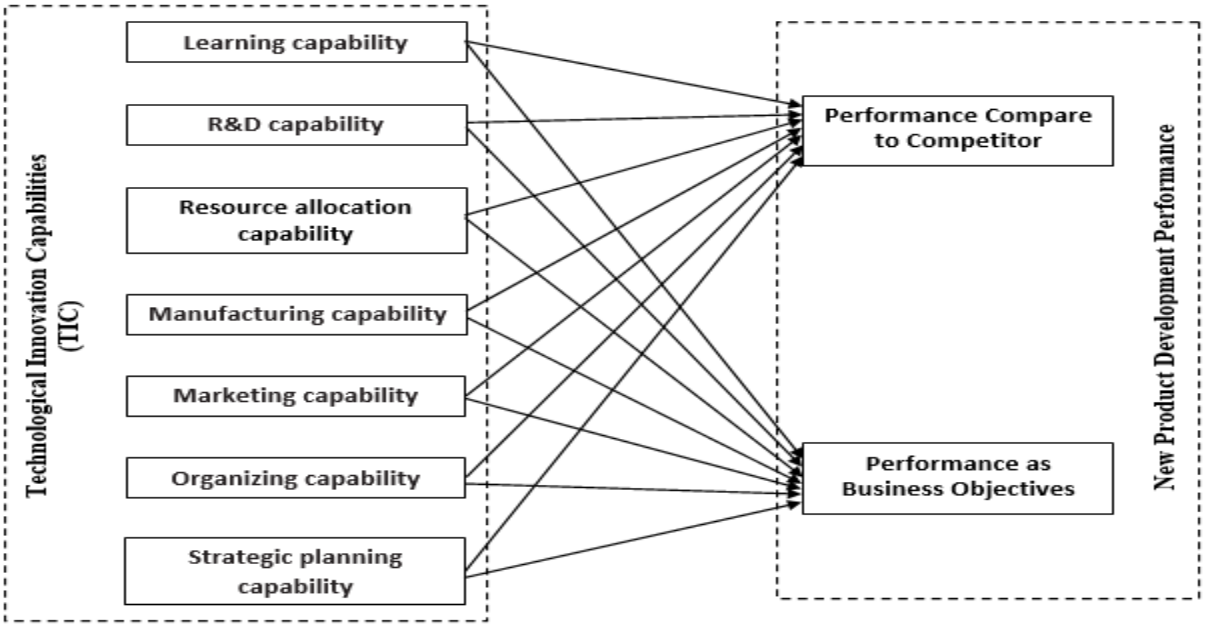

Fig. 1. Proposed Conceptual Framework

4. Further research

The conceptual framework presented in this paper needs to be followed up in the form of empirical research to test the hypotheses presented. From our perspective, further research will be needed to measure each variable from TIC which has an impact on NPD performance. Very possible impact of each TIC variable on NPD performance will be different in each type of industry. The results of the impact on the TIC variable can be a recommendation for developing TIC variables in certain types of industries.

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