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Determinants of Innovative Performance in the Manufacturing Industry in Malaysia.

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Abstract

The intention of this paper is to review the determinants of innovative performance and to explain the implications of the determinants towards the firms in the manufacturing industry in Malaysia. This paper also illustrates the importance of innovative performance in the manufacturing firms in Malaysia. It is suggested in this study that several industry characteristics and firm characteristics are the determinants that affect innovative performance in a firm in the manufacturing industry. Given that a firm's innovative performance is able to increase its revenue generated, determinants affecting innovative performance in a firm should be given equal priority like quality and productivity to ensure continuous revenue generation and sustainability of the firm.

Keywords: Innovative Performance, Industry Characteristics, Firm Characteristics, Manufacturing Industry.

Introduction

Malaysia has been experiencing rapid development in the manufacturing industry since 1980's. In the beginning of the introduction and development of manufacturing industry in Malaysia, the focus was to offer cheap labour and good facilities so that foreign firms would be attracted to have their factories here and manufacture products developed by the firms. The intention was to create job opportunities to the local people while increasing income via taxes and expenditures. Innovation was not the priority during the 1980's. However, with the increasing number of highly skilled and educated workforce in the market, and the increasing maturity in manufacturing industry worldwide, the significance of research and development (R&D) and innovation in manufacturing industry has slowly gained attention from the government and scholars. Several studies have illustrated the positive effects of innovation on productivity and product novelty in the manufacturing industries (Crespi and Zuñiga, 2010). Besides that, the impact of innovation in service industries was also being investigated. For example, Barras (1986, 1990) has discussed and showed the innovation pattern in the service industry in his work on the inverse product life cycle. In addition, Castellacci (2008)

proposed a sectoral taxonomy which mixes the service and manufacturing industries to prove the significance of knowledge exchanged between the two industries. This paper studies the determinants of innovative performance in the manufacturing sector in Malaysia, utilizing the data collected under National Survey of Innovation and some other resources. The effects of firm and industry characteristics that influence the innovation level in the manufacturing firms were being explored. The firm characteristics include the age of firm, extent of local ownership, firm size, export shares of revenues, and availability of publicly funded programs. The industry characteristics explored consist of the type of industry and the effect of market concentration towards innovative performance.

Innovative Performance

Theoretically, innovation is defined as a new or improved goods and processes brought into the market or within the firm. Innovation includes the development of new technology, merger of current technology and the usage of technology knowledge obtained by the firm. The development of a novel product or process contains characteristics with huge difference from the existing products. An innovative product is not necessary to be new to the market, but it should be a novel product in the company. The new product could be developed by the company itself, or by other companies. However, a company which is purely selling an innovative product developed and produced by other companies does not mean that the company is innovative and owns the innovative product. Innovation of a product is found in the development of a product itself which is totally new and is notably improved from the current product, in terms of fundamental characteristics, technical specifications, hardware and software used. Apart from the innovation in goods, the process of producing goods includes improvement in production methods and the way the goods and services were delivered. The outcome of process innovation will greatly increase the output level, product quality or decrease the costs of manufacturing and distribution. However, although similar improved process could have been introduced in other companies, the process innovation must be new to the company. Also, the organizational or managerial changes are not considered as part of the process innovation. Scholar Barras (1986) is among the earliest researcher to realize that service innovation is interactive, and interdependent with the manufacturing industry. By taking into consideration of service areas such as banking, insurance and financial services, he had successfully developed a model to explain innovation in services, namely the reverse product cycle (Barras 1986, 1990). In the model, it is shown that services' life cycle moves oppositely to the industrial products' life cycle, and research and development of the firms contribute to service innovation. Since then, related studies and researches started to emerge, for instance two well-known scholars Tether and Takhar (2008) have introduced an innovation typology that includes manufacturing and service industries. Based on the firms' orientation towards innovation, they categorized firms based on the firms' innovative features, such as their sources to reach technologies, and the firms' recognition of its innovation competencies. In relation to Tether and Takhar (2008) research direction, Castellacci (2008) has developed a typology which is partnering both manufacturing and service industries within a single analytical framework. The data used is based on the Fourth Community Survey. Castellaci's (2008) typology was developed based on the Fourth Community (CIS4, 2002-2004), for a sample of manufacturing and service industries in 24 countries in Europe. Castellacci (2008) stressed that manufacturing and service industries are two interdependent parts of the economy, hence the two sectors should be combined under the same framework. In order to achieve this, Castellacci (2008) added in the essential roles

played by the relationship between several kinds of manufacturing and service industries. He defined it as the extent of vertical linkages and knowledge exchanges that bring manufacturers, suppliers and customers of novel technologies together. Castellacci's (2008) research has provided a combined view of the characteristics that innovation takes place in the manufacturing and service industries.

Industry Characteristics

Type of Industry

Firms in higher technology industries usually have higher tendency to be involved in innovation compared to the firms in lower technology industries. It is because firms in higher technology industries are rich in resources and capabilities. For example, huge chip development and manufacturing companies invest millions of dollar in the innovation and development of new innovative products. Besides that, these companies are also equipped with talents recruited to produce state of the art technology products to remain competitive in the chip industry. Hence, the companies in higher technology industries tend to have higher level of innovation performance compared to companies in lower technology industries.

Market Concentration

Theoretically, market concentration means a function of number of firms and each of the firms' shares in a market. Regression analysis by a Cassey (2004) proved that the higher the market concentration, the higher the inclination to innovate. This is because higher number of firms means higher competition. Hence the firms will need to keep innovating to sustain their competitive advantage and to maintain their market share in the industry. An industry with higher market concentration will indirectly force the companies to focus on innovative performance so that they can be unique compared to their competitors.

Firm Characteristics

Age of the Firm

Age of firms and its innovative performance has a negative relationship. This indicates that younger firms tend to innovate more as compared to older firms. This is because older firms has established a way of working which is proven to be effective in the past. Hence, these firms are more confident or comfortable to re-use the same strategy to face market turbulence. On the other hand, younger firms are mostly managed by young entrepreneurs who are willing to try new things. Hence, younger firms are generally more innovative compared to older firms. However, this observation does not applies to older firms with young or adventurous leadership teams.

Extent of Local Ownership

Based on a research carried out by Cassey (2004), the extent of local ownership shows a negative relationship with the innovative performance. This means that the higher the level of foreign ownership in a firm, the higher the tendency of the firm to focus on innovation when it is being compared to a firm with lower proportion of foreign ownership. This could be due to fact that firms with high local ownership level are usually in the traditional and lower technology industries with limited resources in research and development. In contrary, firms with high foreign ownership are usually high-tech firms with huge resources in research and development department. Hence, these firms are more likely to spend more funds and resources in innovation. Foreign ownership in a firm is an important determinant for

technological innovation. Research by Crespi and Zúñiga (2010) also found that firms with 10% of foreign ownership or more are generally more keen to be involved in innovation and hence the rate of innovation intensity of these firms will be higher.

Firm Size

Benavente (2006) and Crespi et al (2007, 2010) concluded that the larger the manufacturing firms, the more likely they are to involve in innovation efforts. This is because larger firms tend to have more resources in terms of fund and talent. Besides that, larger firms are usually involved in higher technology industries. Hence, they need to and are capable to invest more in innovation activities in order to be competitive in their industries. Smaller firms are usually the consumers in technologies, and the allocation of resources to innovation and development is usually lesser due to limited resources. Benavente (2006) and Crespi and Peirano (2007) also found that larger firms are usually benefited from economies of scale and having advantage of larger pool of human resources which are two essential factors that required for innovation.

Share of Export in Sales

The percentage share of export in sales is exhibiting a negative relationship with innovative performance, this shows that the manufacturing firms which manufacture goods for domestic market shows more emphasis in innovation compared to those manufacturing goods for foreign market. This result could be due to strict criteria imposed for goods imported from other countries in most countries. Hence, exported goods needs to adhere strictly to the countries' rules in order to ensure smooth custom clearance. For internal market, producers do not need to go through this hassle of custom clearance and other procedures. Therefore, lesser rules lead to higher level of innovation in these local firms.

Availability of Publicly Funded Program

Government in developing countries like Malaysia do allocate funds for firms in the higher technology industries to encourage them actively involved in innovation and development activities. Studies performed by Dutrénit et al. (2010, 2013) showed that accessibility to publicly funded programs in support for innovation plays a vital role for the decision to get involved in innovation activities. The effect of availability of public funds on innovation is high and significant especially in manufacturing industry. Hence, manufacturing firms which received funds from the government are more willing to invest in innovation activities owing to additional financial support from the government.

Theoretical Framework

In this study, the researchers have identified key determinants that affect the innovation performance in the manufacturing industry in Malaysia. The determinants were divided into firm characteristics and industry characteristics. Firm characteristics include age of firm, extent of local ownership, firm size, share of export in sales and availability of publicly funded program. Besides that, the industry characteristics consist of type of industry and market concentration. Based on the literature review, a theoretical framework has been developed to represent the effect of industry and firm characteristics towards innovative performance in manufacturing industry in Malaysia. The proposed theoretical framework is shown in Figure 1 below.

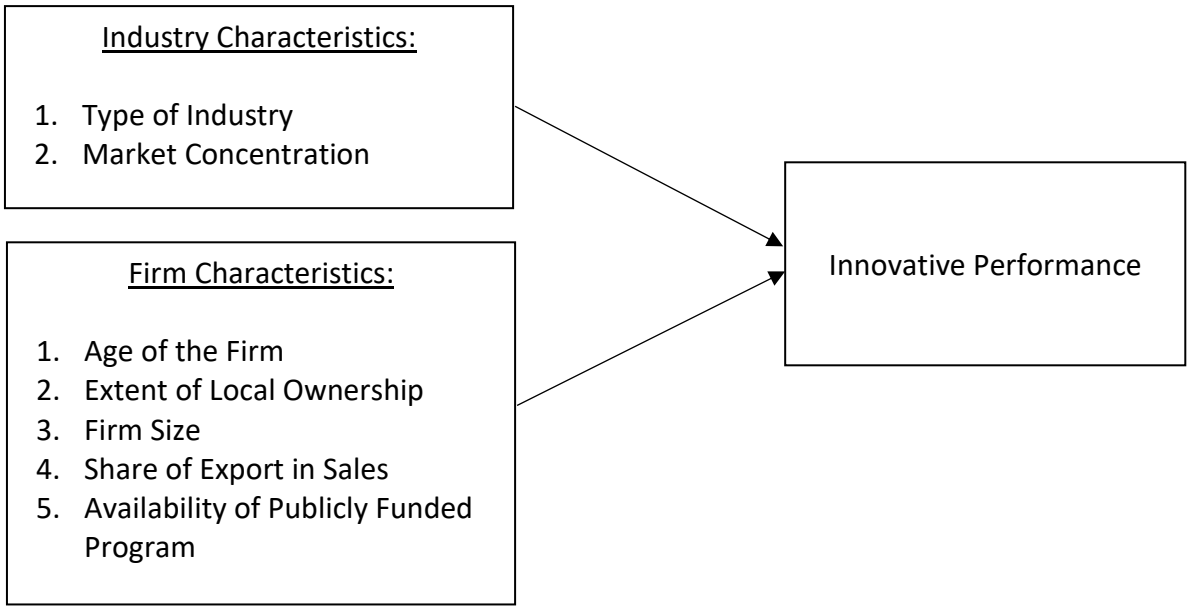

Figure 1: Proposed Theoretical Framework

Research Implications

Theoretical Implications

This paper aimed to develop a theoretical framework to identify determinants that influence innovative performance in the manufacturing industry in Malaysia. Innovative performance in a firm should be given equal priority like quality and productivity to ensure continuous revenue and sustainability of a firm. In this study, the effect of firm and industry characteristics that influence innovative performance in the manufacturing industry were being explored. Very few studies have been done to identify firm's characteristics and industry characteristics in determining innovative performance in the manufacturing sector in Malaysia. This study has identified age of firm, extent of local ownership, firm size, share of export in sales and availability of publicly funded programs as firm characteristics and type of industry and market concentration as industry characteristics in determining innovative performance. It is expected that the proposed theoretical framework will provide more understandings and add new literature in the current research knowledge in terms of technological innovation and research and development. It provides a new platform for researchers to investigate the determinants from different areas and angles and identify significant factors that contribute towards innovative performance.

Practical Implications

Since manufacturing industry is one of the major contributors to the nation's economy, the Malaysian government is very supportive in the development of manufacturing industry. It is important for firms in this industry to promote innovative culture to increase productivity and profitability in the long run. From the practical implication perspective, in order to improve innovative performance of the firm, management should plan and implement innovative strategies such as welcoming foreign investors to improve financial strength and talent pool in the organization, utilize publicly funded programs in product and process innovation and increase the share of domestic market.

Conclusion

In conclusion, this study proves that large and young firms have higher tendency to innovate than the small and old firms. In addition, it also shows that manufacturing firms with higher foreign ownership and involved in publicly funded programs are prone to innovate. This indicates that financial strength and talent pool are important factors to promote innovative performance in the manufacturing industry. However, this study suggests that firms with lower shares of export sales have better innovative performance than those with higher shares of export sales. In terms of industry characteristics, it is recommended that manufacturing firms in higher technology segment have higher tendency to innovate than firms in lower technology segment and firms in higher market concentration is always associated with higher inclination to innovate.

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