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Innovation in Realizing Quality of Production in Malaysia

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Abstract

This study is about Malaysia, innovation in its manufacturing industry. The purpose of this paper is to explore the relationship between innovation practices and quality of production in Malaysia's manufacturing companies based on a questionnaire survey sent via mail. The relationships theoretical model among the constructs of innovation practices and quality of production were proposed and tested using multi-regression analysis. Analysis of the data in this study supports a strong positive relationship between innovation practices and quality of production which was consistent as claimed in the previous studies. The findings of the study will further contribute and strengthen to previous literature in several ways.

Keywords: incremental/radical innovation, innovation extensiveness, quality of production, manufacturing

1. Introduction

Malaysia have embarked on industrialization as a major aim in their economic development soon after its independence in 1957 (Kamaruddin & Masron, 2010) which has blossomed remarkably since the early 1980's from the agricultural economy to the industrial-based economy. The outcome of the transformation has increase the important role of manufacturing in leading growth of Malaysia's economy. This immense economic transformation was carried out based on the realization that Malaysia needs to ensure its economic growth through less dependent on imports. As stated in a report published by the Malaysian Industrial Development Authority in 2013, it was reported that the foreign direct investment (FDI) inflows surged to 24 percent to RM38.8 billion compared to RM31.1 billion in 2012 as shown in Figure 1. As of 2013, the country had reduced the net direct investment outflow to RM4.1 billion from RM21.1 billion the year before (MIDA, 2013).

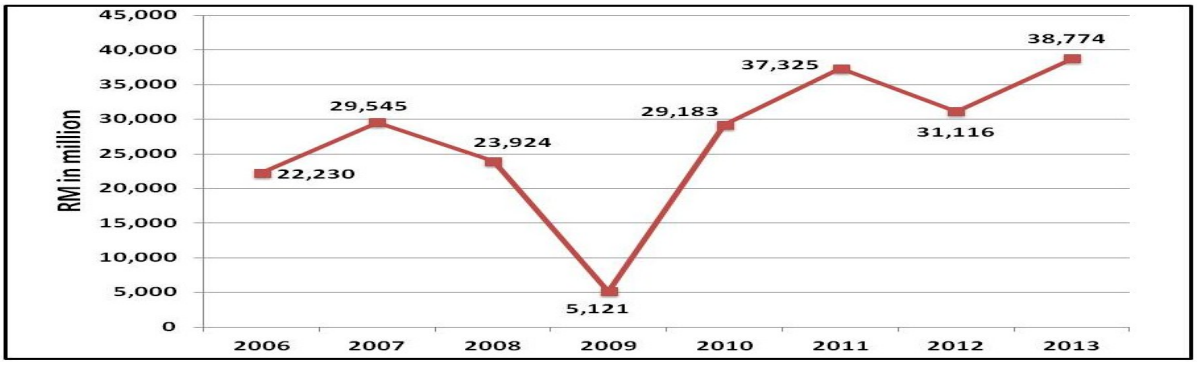

Figure 1. Global FDI inflows into Malaysia (source: Department Of Statistics, Malaysia)

In 2013, the manufacturing sector remained the largest recipient from the total global FDI inflows into Malaysia, followed by services, mining and quarrying sector. The report issued by MIDA also stated that manufacturing sector in Malaysia continued to be an important part of Malaysia's industrialization efforts, enticing RM52.1 billion worth of investments in the same year. With investments of RM52.1 billion, a total of 787 manufacturing projects were approved in 2013 (refer Table 1).

Table 1. Establishment of Manufacturing Projects by Industry in Malaysia, 2000 – 2013.

Year	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
No. of Projects	805	928	792	965	1,101	1,027	1,077	949	919	766	910	846	804	787

Source: Malaysian Investment Development Authority, Malaysia Investment Performance Report, 2001-2013.

MIDA (2013) revealed that RM21.6 billion (41.5%) of the total investments approved in 2013 was domestic investments and RM30.5 billion (58%) was foreign investments. However, its share appears to be on a decline where it received 37.6 percent of the total FDI inflows in 2013, down from 42.11 percent in 2012. This reflects the declining contribution of the manufacturing sector to Gross Domestic Product that had fallen to around 24 percent in 2013.

Malaysia has mark itself as one of the fastest growing economy in the major economies of Southeast Asia which enjoyed high growth rates in the manufacturing industry over the past decade which contributes approximately 40 percent of gross domestic product to the country (Keng, Binshan, Pei and Yee, 2012). Although there has been progress in the manufacturing sector in Malaysia, however, the progress is still considered to be at a moderate level. Given the economic trends involved in globalization and liberalization, the competition between manufacturing companies cannot be avoided; this includes the manufacturing sector in Malaysia. Manufacturing companies need to change their way of conducting business by giving more emphasize to higher quality, efficiency and cost effectiveness in the production systems and processes. The prime concern should also be given to research and development (R&D) towards innovative and cutting edge technologies in the manufacturing sector.

Generally, the manufacturing sectors face some challenges which come from various issues such as financial, R&D, information and communication technology, knowledge, and technical expertise. As an industrial-based nation, Malaysia is also experiencing the same fate. The manufacturing sector in Malaysia is now encountering a series of gaps between the information system and overall resources, which causes delays on the management of its overall processes. Most of Malaysia's manufacturing companies are still working with the conventional manufacturing processes (The Federation of Malaysian Manufacturers, 2003) and some companies will either outsource their production for the sake of sustaining its competitiveness or retain the conventional works.

Hence, there is tendency that manufacturing sector in Malaysia is defenseless to competition from within and outside the industry that propose alternatives to the product, raw materials and components, and the manufacturing process. For that reason, the manufacturing sector in Malaysia still has a long way to go before they are able to achieve the standards of global manufacturing environment. Dynamics of the global economy are changing and increasing competition demand more in terms of renewal and transformation. Therefore, there is a need to develop more innovative-driven enterprises in Malaysia in order to enhance national production competitiveness and resilience.

2. Quality Production

Previous studies have shown that quality management, assurance and control ranked as the second most important area of manufacturing process decision making, after plant and equipment (Altendorfer & Jodlbauer, 2011; Battini, Faccio, Persona & Sgarbossa, 2012). On top of this, it was also found that quality is the most crucial competitive concern for producers, followed by product cost (Alwan, 2012). Quality management, assurance and control in production or manufacturing lead to correction of problems, eliminating waste, reducing cost, shorten production lead time, reducing inventory, ensuring safety and comfortable working conditions (Foster, Thomas, & Cynthia 2011; Battini *et al*., 2012).

As Battini *et al.* (2010) confirmed that for the last 20 to 30 years, quality has been one of the most important problems companies have been focusing on in which that quality has become widely regarded as a key for success particularly in manufacturing industries due to the increasing competitiveness of markets. The improvement of production quality as mentioned by Talha (2014), believes that it is a long-term dedication to constant improvement in every facet of the production process. He added that advanced and highly reliable manufacturing methods results in the achievements of a very high standards of product quality in which that this has become a competitive strategy for most firms.

Battini *et al*. (2012) corroborate that to maintain competitiveness in the global markets, high quality of products is a critical matter for manufacturers to maintain. The accomplishment to participate in highly competitive markets, achieve restructuring, follow low-cost strategies, or produce products and processes that surpass

technological barriers calls for a great amount of competence in the form of innovation (Zamora, Benito and Gallego 2013). It was concluded that innovation is completely consistent to business performance. Correspondingly, Hassan, Shaukat, Nawaz and Naz (2013) which aims to explore the result of the types of innovations on firm's performance reveals that the firm performance includes production, market, innovation and financial performance as its measure. Hassan *et al* (2013), further stated that the building blocks of production performance are quality improvement, cost efficiency, speed to production and flexibility in production which leads to profitability. It was also concluded by Hassan *et al.* (2013) that with and increased innovativeness, a higher firm performance can be achieved. Furthermore, Zamora *et al.* (2013) affirmed that it might give organizations efficiency and effectiveness given that if it maintains innovative advantage. This is also supported by Talha (2004) where in the manufacturing industry, the factor that determines a firm's success or failure in the world-wide marketplace is the quality of the product. Therefore, for a firm to achieve a sustainable competitive advantage, Hassan *et al.* (2013) stated in their article that a firm should improve its methods and activities through innovation. This is also deemed as true for Baregheh, Rowley and Sambrook (2009) that innovation creates value and sustains competitive advantage. As Prajogo (2006) revealed in his article that a major impact of innovation was found in manufacturing industry and has a sturdier effect on performance rather than that in the service sector in which service firms have benefited less.

In conclusion, the practice of innovation in the production process shows that there is a close correlation between innovation and efficiency and effectiveness in production. This conclusion therefore provides the basis for this study which aims to explore the relationship between innovation practices and quality of production in Malaysia's manufacturing companies.

3. Innovation

Previous research into innovation has focused on various aspects, including the definition of innovation and models of innovation (Afuah, 1998), sources of innovation (Tidd, Bessant, & Pavitt, 1997), and the generation of innovation from within firms or outside of firms (Nohria & Ghoshal, 1997). Innovation can be described as the creative process through which new products, services or production processes are developed for business unit (Arias-Aranda, Minguela-Rata & Rodriguez-Duarte, 2001). Szeto (2000) define innovation as any newly established idea, practice or material artefact that is professed to be new by the early units of adoption within the appropriate environment or as adapting new ideas and artefacts that are relevant to product development for a particular market. Another interesting definition of innovation defined by Szeto (2000) mostly includes both enhanced technology and better procedures of doing things.

Innovation, overall, can be summarized as adaptable new ideas for product or service development with enhanced characteristics, quality manufacturing and appreciated aesthetics to meet the needs of existing or possible market in incremental or radical movement and may generate profit with least amount of cost (Szeto, 2000). McAdam and McClelland (2002) argue that several published articles have given different definition on innovation and this can mislead the literature reviewer. They suggest that in each of these definitions creativity is seen as part of innovation, namely the front-end of the innovation process. Gurteen (1998) likewise describes creativity as the generation of ideas while innovation is concerned with putting these into action by shifting, refining and implementing.

Companies put massive attempt in beating the competition and improvement in the market game by establishing innovations. According to McAdam and McClelland (2002), the increasing competitive markets have forced the needs of organizations to improve their competitive advantage in the market and develop the effects of innovation. Zakic, Jovanovic and Stamatovic (2008) claim that the main innovation model and development level facilitate managers to be acquainted with what types of innovations and strategies they should consider in different phases of their development and different competitive environment. Rita, Ming-Hone, Venkataraman and MacMillan (1996) have linked innovation to the RBV of strategic management providing four antecedents, which are the causal understanding, innovation team proficiency, emergence and mobilization of new competences, and creation of competitive advantages. So many research findings are providing support of the fact that competitive advantage and firm innovation are extremely related, and many authors have called for their connection (for example, see; Kuczmarki, 1995; Zien & Buckler 1997; Ahmed, 1998; Drejer, 2002). Some researchers have even linked innovation on organizational profits (e.g. Buckler & Zien, 1996; Kleinnecht & Mohnen, 2002; Rooks, Oerlemans, Buys & Pretorius 2005).

With the presence of a dynamic marketplace nowadays coupled with the ever changing customer demands and lifestyles, there is an urgent need for organizations to innovate in an attempt to exploit the opportunities offered by technology and changing marketplace, structures and dynamics (Baregheh *et al*., 2009). Correspondingly,

Johne (1999) also mentioned in his article that if a business does not innovate, it is susceptible to the risk of being undertaken by competitors in this fast changing markets and technology.

It is also important to recognize the types of innovation as pointed out by Johne (1999) in which he suggested that there are three types of innovation and they are the market innovation, product innovation and process innovation. These three types of innovation engage in different types of innovation in a business for example, Johne (1999) stated that market innovation aims to improve the mix of target markets and how to serve them in the best way possible. Second, the product innovation aims to improve the types of mix that a business can offer, and lastly the process innovation aims to improve the mix of internal operations.

Moreover, Cooper (1998) claimed that despite the many definitions of innovation used, it was widely agreed by practitioners and students of innovation that innovation comes in many forms in which that radical, incremental, product, process, administrative and technological are the most prominent innovation dimensions. Morris (2013) pointed out that a business should first differentiate between two types of innovation which is the continuous and discontinuous innovation that has different objectives and eventually presented a 32 possible innovation targets that a business can focus on. They are categorized under six components of target areas that comprised of business, administration, organization, service, supply chain, and product.

Based on the effect on behavior and social structure, Saaksjarvi (2003) categorizes innovations into continuous (a slight modifications to current products and/or services), dynamically continuous (the creation of a new product or service or modifications to existing ones), and discontinuous (the creation of previously unknown products that typically require a significant amount of new learning). Avermaete, Viaene, Morgan and Crawford (2003) on the other hand, categorize innovation into various classifications, which include: product innovation (good, service and idea); process innovation (technology and infrastructure); organizational innovation (marketing, purchasing and sales, administration, management and staff policy); and lastly market innovation (exploitation of territorial areas and penetration of market segments).

A major determinant of innovation as pointed out by Ahmed (1998) is organizational climate. Possession of positive cultural characteristics provides the organization with essential ingredient to innovate. Moreover, Ahmed (1998) states that the culture of innovation needs to be coordinated with the appropriate organizational environment. In the same paper, he also provides personality traits for innovative individuals, which consist of high valuation of aesthetic qualities in experience; broad interests; attraction to complexity; high energy; independence of judgment; intuition; self-confidence; ability to accommodate opposites; firm sense of self as creative; persistence; curiosity; energy; intellectual honesty, and internal locus of control (reflective/introspective). Most successful innovations are based either on the collective result of incremental changes of products and production processes or on creative blends of already existing techniques, ideas and methods (Arias-Aranda *et al*., 2001). Bodewes (2002) affirms that organic systems appear to be a more appropriate organizational context for innovation rather than mechanistic systems. Being innovative according to Ahmed (1998) demanded more than just a debate and resources. It requires an organizational culture that continuously leads organizational members to strive for innovation that is favorable to creativity. According to Pun and Gill (2002), there is a common set of practices that, if executed, will lead to respectable performance. By implementing these efforts will bring changes to the existing operations and practices of organizations. However, these required changes are not only about technology or new management tools, but also about culture, value, management, people and communication (Bennett & Durkin, 2000).

It would also be sensible to anticipate that not all firms should be innovative in the same way. Innovation needs to be directed at products, markets, production competencies as well as administrative competencies (Drejer, 2002), which are needed to stimulate performance. Corbett and Rastrick (2000) make a similar point that having a strong culture is the key to organizational success. Innovation is one of the primary sources of a competitive advantage and they are crucial for a company's growth. As discussed previously in this study, competitive advantages lead to high performance. The importance of innovation to organizational performance has led to a growing interest in the topic by researchers.

Avermaete *et al*. (2004) use levels of R&D intensity and introduction of new products and processes to distinguish four groups of firms in the food industry. Specifically, firms without any product or process innovations are classified as non-innovators; for those firms with product and process innovations, R&D intensities are used to discriminate between traditionals (no R&D activities), followers (R&D expenditures less than 1% of revenues) and leaders (R&D expenditures more than 1% of revenues).

Bhattacharya and Bloch (2004) use a similar criterion, whether the firm has developed new or improved products and services, to determine the innovativeness of a firm. This is also supported by Davila, Epstein and Shelton

(2006). The degree of innovation according to them categorized innovation into three types: incremental, semi-radical and radical innovations. A radical innovation is a product, service and process with entire unique or significant improvements in existing features which improve the cost and performance (Leifer, O'Connor and Rice, 2001). Radical innovation is highly risky for the business because radical innovated products are more difficult to commercialize. However, on the other hand, radical innovation in product, service or process is crucial for the business because it involves the development and application of new technology. Important aspect of radical innovations is that to what extent new technology is more sophisticated and advance as compared to current technology (Christenson & Overdorf, 2000; Govindarajan & Kopalle, 2004). Radical innovations have the potential in offering vast amount of profits and competitive advantage, but demand substantially higher level of risk, company effort and resource engagement. Incremental innovations have more uncertain returns, but demand lower risk level, level of efforts and resources and are generally more successful. Semi-radical innovations are somewhere between the two of them.

Considering the importance of innovation practices as a crucial process for the wellbeing of an organization especially in the manufacturing sector, it is surprising that there are very few research studies examining its importance in the Malaysia's manufacturing environment. Common sense precept that companies that innovates successfully prospering at the expense of their less able competitors. Hence, innovation is fundamental to the manufacturing industry in Malaysia in order for them to survive and maintain their competitiveness in the market place. In respect of the matter, this study has taken a closer look at the role of innovation in promoting the efficiency and effectiveness of production, which also known as quality of production in Malaysia's manufacturing industry. These include how well the products manufactured conform to specifications and how well those specifications reflect what the customers really value (Scmenner & Vollmann, 1994). For that reason, this study has decided adopting innovation based on Avermaete *et al.* (2003). This is to examine whether there is a statistically significant relationship between innovation and quality of production in Malaysia's manufacturing companies by distinguishing between incremental and radical innovation adoptions.

4. Research Background and Analysis

A total of 600 questionnaires were distributed to a selected manufacturing companies registered with the Federation of Malaysian Manufacturers in Malaysia. This study used a seven-point Likert scale for all the items in the questionnaire. The direction of the seven response categories was ranging from 1 = Strongly Disagree to 7 = Strongly Agree. However, innovation was measured using scale anchored by 1 = incremental to 7 = radical. The scales ranging from 5 to 7 were grouped as "agree", 4 as "neutral", and 1 to 3 were grouped as "disagree". Disproportionate stratified random sampling was applied in the study due to the nature of the unit of analysis which was heterogeneous. 233 completed questionnaires were returned but only 201 questionnaires were usable for analysis.

The participants chosen for this study were the organizations' representatives who were authorized to act or speak on behalf of the organization. This include the presidents, executive directors, general managers, accountants or financial controllers, and managers in multi-disciplined. Table 2 shows the breakdown of participants involved based on the categories predetermined in this study.

Table 2. Participants of the study

	Position	Frequency	Percentage
1	President	5	2.5
2	Managing Director	29	14.4
3	Director / Executive director	6	3.0
4	General Manager	45	22.4
5	Manager (Human Resource, Factory, Sales, Admin, etc.)	107	53.2
6	Accountant / Financial controller	9	4.5
	Total	201	100.0

4.1 Factor Analysis

In order to determine the correlation among variables, exploratory factor analysis was performed separately on each studied variables: innovation (8 items) and quality of production (5 items). The first factor is innovation which is divided into two that consist of "innovation incremental/radical improvement" and "innovation extensiveness". The first innovation construct was done on innovation incremental/radical improvement, followed by innovation extensiveness. The innovation incremental/radical improvement construct was

represented by four items. There are product improvement, process improvement, managerial improvement, and marketing improvement.

Table 3. Factor analysis of innovation incremental/radical improvement

	Items	Factor Loading
1	Process innovations: mainly incremental or radical	0.88
2	Managerial innovations: mainly incremental or radical	0.85
3	Marketing innovations: mainly incremental or radical	0.85
4	Product improvements: mainly incremental or radical	0.77
	Eigen Value 2.79	
	Total Variance Explained 69.76	
	Measure of Sampling Adequacy 0.72	
	Bartlett's Test of Sphericity 418.18	
	Significant 0.00	

The results of factor analysis on "innovation incremental/radical improvement" are presented in Table 3. The initial run of the factor analysis on 4 items produced a single factor with eigenvalues of 2.79. This explained 69.76% of the total variance. The Bartlett test of sphericity was significant at 0.00 which shows that the factor analysis was feasible. This study also used the Kaiser-Meyer-Oklin (KMO), which is a more discriminating index of factor analyzability. For the data set of "innovation incremental/radical improvement", it was 0.72, which also supported the analysis. The anti-image correlation exceeded 0.5 and the communalities ranged from 0.59 to 0.77. The factor loadings indicated above recommended cut-off point value of 0.40 for practical and statistical significance, which were in the range of 0.77 to 0.88.

The second factor analysis was done on "innovation extensiveness" which can be referred to Table 4. This factor was represented by four factors which included product, process, managerial and marketing. The initial run of the factor analysis on 4 items of factor analysis produced a single factor. It has eigenvalue of 2.65 which accounted of 66.22% of the total variance. The KMO value was 0.63 and the Bartlett test of sphericity was significant at 0.00. Anti-image correlation of the remaining 4 items of innovation extensiveness exceeded 0.5. The communalities of the 4 items ranged from 0.50 to 0.75. The factor loadings for the remaining variables were in the range of 0.71 to 0.87.

Table 4. Factor analysis of innovation extensiveness

	Items	Factor Loading
1	Extensiveness of Process Innovations	0.87
2	Extensiveness of Managerial Innovations	0.86
3	Extensiveness of Marketing Innovations	0.81
4	Extensiveness of Product Innovations	0.71
	Eigen Value 2.65	
	Total Variance Explained 66.22	
	Measure of Sampling Adequacy 0.63	
	Bartlett's Test of Sphericity 360.65	
	Significant 0.00	

The third factor analysis was done on "quality of production". An approximately 28.95% of the total variance was captured by factor three that has an eigenvalue of 6.36 on the initial run of the 5 items produced. The Bartlett test of sphericity was also significant at 0.00 which had shown a feasible factor analysis. The KMO value was 0.86 and the anti-image correlation for the entire variables were greater than 0.5. Only 3 items were retained on the final run of the factor analysis that was in the range of 0.85 to 0.87.

4.2 Reliability Analysis, Mean, Standard Deviation and Correlation

The Cronbach's alpha for each of the dimensions of innovation and quality of production are presented in Table 5. The Cronbach's alpha values for all of the variable constructs disclosed significantly over 0.80. In most literature, the reliability coefficient of 0.70≥ is considered acceptable in most social science research

circumstances. The Cronbach's alpha values for the two constructs measuring innovation have a reliability coefficient between 0.83 and 0.85. Meanwhile, the three items used to measure organizational performance produced an alpha coefficient of 0.91.

Table 5. Reliability analysis, mean, standard deviation and correlation

Variables	No. of Items	Cronbach's Alpha	Mean	SD	1	2	3
1. Innovation Incremental/Radical Improvement	4	0.85	3.68	1.30	1		
2. Innovation Extensiveness	4	0.83	5.02	1.08	0.60**	1	
3. Quality of Production	3	0.91	5.64	0.91	0.27**	0.43**	1

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 5 also shows the scores of all the variables constructs applied in this study, along with means and standard deviations. The mean scores for each of the three variables varied from 3.68 to 5.64, indicating that respondents had a moderate opinion of all the dimensions. The standard deviation ranged from 0.91 to 1.30. "Innovation incremental/radical improvement" with four items had the lowest mean at 3.68. "Innovation extensiveness" with four items had a mean score of 5.02. The standard deviation for both components was in the range of 1.08 to 1.30. The last component that is quality of production with three items recorded mean scores of 5.64, with a standard deviation of 0.91. It was found that both components of innovation have positive correlation with quality of production. Innovation improvement appeared to be positive but moderately correlated with quality of production, i.e. $r = 0.27$, $p < 0.01$. The results also disclosed that the second dimension of innovation which is "innovation extensiveness" also correlates moderately with quality of production, i.e. $r = 0.43$, $p < 0.01$.

4.3 Multiple Regressions

As mentioned earlier, the objective of this study is to investigate whether there are significant relationships between innovation practices and the quality of production in Malaysia, particularly on the manufacturing industry. In order to test the relationship between the dimensions of innovation and quality of production, the multiple regression analysis was employed to test each of the dimensions representing the independent and dependent variables. Both of these dimensions (i.e. "innovation incremental/radical improvement" and "innovation extensiveness") were tested to check if there are any close relationships on quality of production in Malaysia's manufacturing. Results in Table 6 indicates that 7.1% variances in quality of production can be explained by innovation incremental/radical improvement, i.e. $R^2 = 7.1$, $p < 0.01$. The results show that innovation incremental/radical improvement had positive influence on quality of production ($\beta = 0.27$, $p < 0.01$). Therefore, the relationship between incremental/radical improvement and quality production was positively significant. As also indicated in Table 6, innovation extensiveness had positive influence on quality production i.e. $\beta = 0.43$, $p < 0.01$. This showed that the relationship between innovation extensiveness and quality of production was also positively significant.

Table 6. Regression analysis of innovation with quality of production

Dependent Variable	Independent Variable		Std. Coefficient Beta (β)	Sig.
Quality of Production	**Innovation Incremental/Radical Improvement**		0.27**	0.00
	R^2	0.07		
	Adjust R^2	0.07		
	Sig. F	15.30**		
	Innovation Extensiveness		0.43**	0.00
	R^2	0.19		
	Adjust R^2	0.19		
	Sig. F	45.56**		

Significant levels: **p < 0.01, *p < 0.05

5. Discussion

It is unsurprisingly that there is a significant statistical association between innovation and quality of production in this study which means that innovation plays an essential role in improving the effectiveness and efficiency of

the production process in manufacturing companies in Malaysia. This stood alongside with previous studies and was consistent with what was explained in the literature (e.g. Kuczmarki, 1995; Rita *et al*., 1996; Zien & Buckler 1997; Ahmed, 1998; Drejer, 2002; Zakic *et al*., 2008).

This study focused on the adoption of innovation in the manufacturing companies in Malaysia from two different perspectives that include in terms of its extensiveness in the deployment of innovation and the level of implementation that is either incremental or radical innovation. From the perspective of the innovation extensiveness, participants of this study agreed with en masse that the practice of innovation is widely implemented in their respective companies. The relationship between innovation extensiveness and quality of production was statistically supported. There are many reasons that can describe the result. With Malaysia's position as a producer in Southeast Asia, the low cost advantage alone cannot sustain the economic growth in the long run, given the rapid economic growth of China and India especially in the expansion of the manufacturing sector. Thus, the manufacturing sector in Malaysia needs to find other alternatives for sustaining its competitiveness, especially among developing countries in the region. This can be done by practicing continuous innovation efforts through adapting efficient and effective production processes and developing new products to create demands.

In terms of the level of innovation taking place in Malaysia's manufacturing companies, most of the participants stated that the implementation of innovation in their company performed incrementally which is the dominant form of innovation to address socioeconomic challenges and development context. This can be shown from the result that suggests a direct link between innovation incremental or radical improvement and quality of production. Puga and Trefler (2010) support this statement through the findings of their study that shows an increase of incremental innovation in low-wage countries. They also claim that incremental innovation increasing exports of high quality and sophisticated manufactured products.

6. Implications

Based on this present study, it shall contribute to the theoretical and managerial perspectives. From the theoretical perspectives, the result of this study verified the appropriate effects of innovation towards firm performance (in this study stated as quality of production) and could not be denied (Rosli & Sidek, 2013). For that reason, this study fulfill as the empirical evidence of the aforementioned literature reviews which proposed that innovations are positively related with firm's quality of production and hence shall fill the research gap in this particular area in Malaysia's manufacturing sector. Innovation cannot be ruled out from corporate strategy for various reasons which include the adoption of innovations in the manufacturing process to improve productivity and sustainable competitive advantage. In addition to this, innovation is also capable of enhancing positive reputation of customers' perception for market furtherance.

The contributions of this study are also significant in terms of managerial perspectives in which it should provide managers with valuable insights in terms of understanding the importance of innovation and its advantages towards quality of production. First, managers should emphasis more on innovation as an important mechanism for enhancing quality of production and achieving sustainable competitive advantage. From previous studies, it was mentioned that in order to create value and sustain competitive advantage, organizations need to innovate (Baregheh *et al*., 2009) thereby will increase organizations' performance (Hassan *et al.*, 2013). In order to make this mission possible and as a second point from the managerial perspective, the results of this study also provide an insight that business leader of the manufacturing firms must not neglect the different types of innovations so as to understand the results of each innovation types to organizational performance in which that as argued by Damanpour, Walker and Avellaneda (2009), they revealed that innovation types have diverse attributes, determinants and effects. In addition, Zakic *et al*. (2008) stated that different periods of firm's development and competitive surroundings require different types of innovations and strategies, which manufacturing firms should acknowledged.

Hence, managers should not view investments for innovation as a waste of capital; it should be viewed as a useful way to acquire competitive advantage as pointed out by Zamora *et al*. (2013) that innovation increases the profitability of the firm. Apart from that, the findings also describe and support the fact that innovation is a critical factor in today's industrial activities (Rosli & Sidek, 2013). However, in order to achieve organizational innovation, it is crucial for manufacturing firms to consider organizational climate as a key determinant of innovation which provides necessary ingredient to innovate (Ahmed, 1998). Hence, this study suggests that for future research, it shall become the focus of future studies seeing that in order to implement innovativeness in organization, there is a need to identify its determinants for innovations to occur and build an innovation structure and corporate-wide capability for innovation.

This study also recommends that the managers should develop a clear policy on managing innovation in the same breath with continuous improvement. Equally important, organizations should set their structure right to include an executive-level position that will be responsible for managing and driving innovation agenda in the organizations and also establish mechanisms and structures that help in sustaining innovation over time.

7. Limitations of the Study

Although the research has produced some preliminary findings, its design is not without flaws. A number of cautions need to be noted. The first limitation concerns on the mixed types manufacturing sectors chosen to be the participants of this study ranging from rubber, plastic, metal, ceramic, aluminum, etc. Due to the inconsistent data, there is a potential of samples being dominated by certain manufacturing sectors.

Secondly, in this study the researchers limited themselves to literature research and questionnaire survey. It is suggested that quantitative and qualitative approach should be combined together to minimize the likelihood of biased result. Qualitative approach should be undertaken in future to provide wider perspective to the present study and to observe the respondents in their natural state as undisturbed as possible.

Thirdly, the researchers concern about minimizing the error in ratings among respondents. Even though a sample size of this study is adequate for statistical analysis, discretion must be exercised in generalizing the research findings. As foretasted previously, the respondents for this study were selected amongst the higher level executives and management representatives of the organizations. The researchers have to take this into account as there is a tendency of respondents at this level to respond to questions in a socially acceptable direction which generate to the desired results or avoiding socially sensitive content.

8. Conclusion

Drawing on a sample of 201 companies, the information gathered and findings in this study should be useful for Malaysia's manufacturing industries in terms of understanding the beneficial effects of innovation on quality of production as well as a practical platform in gaining sustainable competitive advantage through innovations. Based on the regression analysis, the result demonstrate that innovation significantly affects quality of production which indicates that innovation plays the key role in all levels of manufacturing particularly in increasing the efficiency of the production of existing products. In essence, the findings of this study suggest that managers of manufacturing firms in Malaysia should give extensive focus on innovations. By considering and implementing innovation, this will encourage firm's performance in the market and eventually sustain competitive advantage.

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