

**ASSESSING THE RELATIONSHIP BETWEEN FIRM RESOURCES AND  
PRODUCT INNOVATION PERFORMANCE: A RESOURCE BASED  
VIEW**

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## ABSTRACT

**Purpose:** This paper seeks an answer to the question about which of a firm's resources contributes most to product innovation performance (PIP). The paper adopts the resource-based view (RBV) and considers both tangible and intangible assets.

**Design/methodology/approach:** A mail administered survey was distributed to a randomly selected list of 700 small and medium enterprises in Malaysia. The response rate was 20.1% and the usable response rate was 15.4% which is favorable for this type of research. As comparable to other SME studies and particularly in Malaysia (Castelli, 2007; Hashim & Ahmad, 2008; Holt, 2007), this relatively low response rate is not surprising for mail administered questionnaire.

**Findings:** Our findings indicate that, in the Malaysian context intangible resources were the main drivers of product innovation performance. This is keeping with the expectations of the resource based view.

**Limitations/ Practical implications:** Establishing a cooperative relationship with the Small and Medium Size Industries Development Corporation (SMIDEC) of Malaysia played a significant role in helping us to garner a larger than expected response rate among the small and medium enterprises (SMEs). Alliances such as this may help researchers improve survey response rates among smaller manufacturers.

**Keywords:** *RBV, Product Innovation Performance, manufacturing*

**Paper Type:** Research

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## 1.0 Introduction

Previous literature suggests that not all resources are equally important to determine firm success and performance. Findings show that intangible resources are important determinants for firm's success. Such assets that are scarce, specialized and difficult to trade, imitate, or appropriate are viewed as intangible (Barney, 2001; Conner, 2002; Ray, Barney, & Muhanna, 2004). This paper focuses on the firm's resources as determinants for product innovation success. The failure or the success of the product innovation will be identified through the PIP indicators.

PIP has been defined as the economic financial and non-financial outcomes of the firm's product innovation efforts (Cooper, 1984; Cooper & Kleinschmidt, 1987; Gemunden & Heydebreck, 1992; Hise & O'Neal, 1990; Hollenstein, 1996) which is new or significantly improved in its technical specifications, components and material, incorporated software, user friendliness or other functional characteristics (OECD, 2005). The relationship between a firm's resources and PIP is less documented. Yet, there has been significant

## 2.0 Firm's Resources

Through the empirical exploration, firm's resources have been classified into six strategic resources that are; 1) physical, 2) reputational, 3) organizational, 4) financial, 5) human intellectual and 6) technological (Amit & Schoemaker, 1993; Barney, 1991; Puente & Rabbino, 2003). Entrepreneurial orientation (EO) has been considered as human intellectual resources since manufacturing firms that are entrepreneurial in nature also strive to gain competitive advantage and adopt both technological and non technological innovation (Weerawardena & Coote, 2001). Fitriah and Wafa (2006) in their recent research found that Malaysian manufacturing firms have a high inclination towards the business orientations whereby entrepreneurial orientation and innovative capability affects innovation. In addition, previous literature stated that soft factors such as employee involvement, management commitment, customer focus, entrepreneurial characteristics, organizational context and the external environment are strategic factors that influence firms effectiveness (Dollinger, 1999; Hashim, 1999; Kao, 1989; Tracy, 1992; Zimmerer & Scarborough, 1998).

Resources can be defined as the productive assets of firms, the means through which activities are accomplished (Mathews, 2006). In the same manner it also has been defined as stocks of available factors (knowledge, physical assets,

compared to their competitors to create value products for consumers and also provide the greatest potential for wealth creation and redistribution (Day & Wensley, 1988).

Generally, resources can be categorized as tangible and intangible entities. These entities are all the object of entrepreneurial attention that can be acquired and take their place as assets on the company's balance sheet (Mathews, 2006). Tangible resources include capital, access to capital and location such as location of the buildings, warehouse and other facilities. Intangible resources consist of knowledge, skills and reputation and EO such as proactiveness, innovativeness and risk seeking ability (Runyan, Huddleston, & Swinney, 2006). Even though it is much easier to protect tangible resources and property such as physical and financial assets in a more concrete form compared to intangibles where many factors could make them flow out of the company, intangible assets are contributing more than tangible assets in creating value. (Apintalisayon, 2008).

The first published papers in entrepreneurship identifies resources in the context of RBV (Greene & Brown, 1997) that are human, social, physical, organizational and financial resources. Technological resources have been identified in subsequent research as an important dimension for national economic development efforts (Venkataraman, 2004). Resources may be acquired in a simple state and combined together by the firm in distinctive combinations that

can be categorized as innovation. Even though a company may be working on an innovation, this does not necessarily mean that a successful product will result (Aboulnasr, Narasimhan, Blair, & Chandy, 2008).

Innovation is a driver of competitive advantage with a combination of resources that creates higher-order competencies that can be referred as capabilities. Organizational capabilities has been defined as a firm's collective physical facilities, skills of employees and firm capacity to deploy its assets, tangible or intangible to perform a task or activity to improve performance (Amit & Schoemaker, 1993; Chandler, 1990; O'Regan, Ghobadian, & Sims, 2006; Teece, Pisano, & Shuen, 1997).

RBV theoretically predicts intangible resources as the important factors for firm success (Amit & Schoemaker, 1993; Barney, 1991; Conner, 2002; Hall, 1993; Michalisin, Smith, & Kline, 1997). For all these reasons, intangibles are able to support a greater level and breadth of activity than are tangible resources. More recent research has shifted attention from tangible to intangible resources as it may be more important from a strategic point of view, since they bring together more frequently the requirements necessary for producing sustainable advantage: to be valuable, rare and difficult to imitate and replace by competitors (Barney, 1991; Hitt, Ireland, Camp, & Sexton, 2001). This paper focuses on six types of

## **Innovation Performance**

Penrose (1959) is identified as one of the earliest major contributors to the theoretical underpinnings of the RBV (Kor & Mahoney, 2000; Rugman & Verbeke, 2002). The heterogeneity approach posits that a firm does not achieve competitiveness because their resources but because of its competence in making better use of its resources whereby the productive services of resources must be discovered over time as entrepreneurs interact with its resources and make subjective decision about resource allocation, deployment and maintenance (Penrose, 1959). The study stressed that the firm is made up of a group of resources not a single unit resource.

This is in common with core competencies concept in RBV of competition that explain a firm's success based on its competencies (Ritter & Gemunden, 2004). Bain-type Industrial Organization (IO) theory also supported the heterogeneity of firm resources especially in the form of legally protected assets such as patents, which are unique to individual firms (Bain, 1959). In addition, the theory concentrates on examining the effects of concentration, firm size and entry barriers as the determinants of firms success (Feinberg, 2007). A firm's entrepreneurial growth process involves two forms of heterogeneity: 1) Resource heterogeneity - Firms differ from one another in their resources that influences strategy and helps explain sustained profitability differences among

The RBV highlights the firm as a unique collection of resources (Barney, 1986, 1991; Wernerfelt, 1984), but the theory emphasizes that not all these resources possess the potential to provide the firm with a sustained competitive advantage (Clulow, 2007). Previous literature on RBV frequently focused on resources as a stable concept that can be identified at a point in time and will endure over time (Dunford, Snell, & Wright, 2003). When referring to the RBV, most researchers focus in strategic context, presenting resources and capabilities as essential to gain a sustained competitive advantage and superior performance (Ferreira & Azevedo, 2007).

Superior performance is usually based on developing a competitively distinct set of resources heterogeneity and strategic deployment and a capable workforce in a well conceived strategy to sustained superior returns (Fahy, 2000) (Collis & Montgomery, 1994). Indeed, strategists who embrace the RBV also point out that competitive advantage comes from aligning skills, strategic deployment, capable workforce with organizational systems, structures, and processes that achieve capabilities at the organizational level (Salaman, Storey, & Billsberry, 2005). On the other hand, firms with bundles of resources that are valuable, rare, inimitable and non-substitutable can implement value creating strategies not easily duplicated by other firms (Barney, 1991). However, it is quite difficult to find a resource which satisfies the Barney's entire VRIN criterion except for a monopolistic type of company.

<b>Author</b>	<b>Contribution to RBV</b>
(Nelson & Winter, 1982; Schumpeter, 1934, 1942)	<p>Technological innovation and “creative destruction” basis of competitive advantage.</p> <p>Managerial action and entrepreneurialism influence firm success rather than market power or industry structure.</p> <p>Firm view as bundle of resources and hierarchies of activities governed by routines and rules.</p>
(Penrose, 1959)	<p>Firm as bundle of resources</p> <p>Firm’s growth is based on the effective use of resources and limited by managerial resources.</p> <p>Entrepreneurship exercised by team, emphasizes alertness as well as judgment.</p> <p>Services rather than resources are stressed.</p>
(Barney, 1991; Rumelt, 1987; Wernerfelt, 1984)	<p>Suggests that to be sources of competitive advantage, resources must be valuable, rare, inimitable and non-substitutable.</p> <p>Individual resources as unit of analysis.</p> <p>Focuses on state (equilibrium) where firms earned sustained competitive advantage.</p> <p>A strategic resource to one firm is also a strategic resource to another firm. Usually no distinction between resources and their services..</p>

*Sources: Foss (2006)*

Integration between the three theories (Schumpeterian, Penroses and RBV) initiates the importance of firm’s internal resources as firm’s capabilities subject to their uniqueness and their ability to create competitive advantage to the firm. Product innovation would be source of competitive advantage and also as a determinant of firm’s success. Its performance indicates portion of overall firm’s

### 3.0 Product Innovation Performance (PIP)

PIP has been defined as the economic financial and non-financial outcomes of the firm's product innovation efforts (Cooper, 1984; Cooper & Kleinschmidt, 1987; Gemunden & Heydebreck, 1992; Hise & O'Neal, 1990; Hollenstein, 1996). On the other hand, the relationship between SME's resources and PIP has been less documented. Yet, there has been significant interest in product innovativeness in Malaysia in recent years. Even so, the innovativeness of a new product and business innovation capability is important to present opportunities for businesses in terms of growth and expansion into new areas as well as to allow businesses to gain competitive advantage.

An effective performance measurement system ought to cover more than just financial measures (O'Regan & Ghobadian, 2004). Financial measures mostly reflect the firm's emphasis on achieving quantifiable performance objective such as profitability, sales, asset etc. (Heidt, 2008). Recently, researchers introduced several non-financial determinants of PIP and the relative positioning of the firms against the leading competitor (Alegre, Lapiedra, & Chiva, 2006; Ulusoy & Yegenoglu, 2005). This type of measurement is becoming popular to overcome the limitation of the financial measurement such as, high probability of low response rate due to reluctance to share confidential data

1997; OECD-EUROSTAT, 1997; OECD, 2005; Valle & Avella, 2003; Wheelwright & Clark, 1992; Zhan & Doll, 2001).

PIP shows up the efficiency and effectiveness of implementation of product ideas whereby it can be determined objectively (analyze in detail) and subjectively (implemented in innovation surveys) by the cost and time of the innovation project (Alegre et al., 2006). The efficiency and effectiveness of implementation have been broken down into resource management (work flow and financial resources) and organizations business practices (business planning process and roles and responsibilities) (Ryan, 2005). Similarly, Wernerfelt (1984) refer that the term of resources frequently limited to those attributes that enhance efficiency and competitiveness. Whereas, Ulusoy and Yegenoglu (Ulusoy & Yegenoglu, 2005) identified that the determinants of competitiveness in their study of Turkish manufacturing industries are product quality performance, delivery lead time and product cost (the most important determinants for manufacturing sectors: food processing, textiles, metal and chemical industries). The chemical industry appears to be the leading sector with their performance in new product development.

Measurement scale of product performance in terms of its innovation, marketability, supply chain and other determinants has been developed by several

non-financial (market share, new product introduction, product quality, marketing effectiveness or manufacturing value-added) (Kapelko, 2006). Profitability and sales growth is the most common measurement of performance (Carton & Horfer, 2006)(Doyle, 1994; Kasim, Minai, & Chun, 1989).

**Table 2: Measurement Scale of Product Innovation Performance (PIP)**

<b>Authors</b>	<b>Measurement scale of PIP</b>
Heidt (2008)	Changes in new product introduction, technical and technological aspects, market response, product quality, product introduction/development time, profitability and market share.
Alegre, Lapiedra & Chiva (2006)	Replacement of products, extension of product range, development of new product, market share evolution, opening new markets, project development time, number of innovation project, cost per innovation project and global satisfaction degree.
Ulusoy & Yegenoglu (2005)	Brand product, after sales service, certified product, ease of use, appearance, short delivery period, product quality performance, production cost and customer focused product.
O'Regan & Ghobadian (2004)	Advertise/promote the product or service, deliver a broad product range, distribute products broadly, respond to swings in volume, make rapid design changes, compete on price, deliver products quickly, deliver products on time, involvement of top management, involvement of line managers, flexibility to adapt to unanticipated changes, provide after sales service, provide high performance products and offer consistent quality.

influence has been moderated by market and technology turbulence in the host country market (Murray & Chao, 2005). Previous literatures on resource-based tradition also suggested that intrinsic attributes of resources and capabilities can slow innovation, and it is not clear when this effect outweighs the benefits of inimitability.

#### **4.0 Research Methodology**

This section elaborates the method of data collection for the present research together with its justifications.

##### **Questionnaire Development and Mail Survey**

The procedure was based upon accepted methods of scale development for a business research (Cooper & Schindler, 2003). The construct domain for the present study was derived from two main sources which are the literature and experts recommendations. Those questionnaires were self-developed questionnaires and were posted to the respondents.

The main reason for choosing mail survey despite of other types of research surveys were due to sensitive questions such as company profits, sales, and number of employees that were requested in the survey. In addition, this type of survey provides a wider geographical coverage at a lower cost. However, it is expected that this method yield a lower rate of response. Learning from previous

As mentioned earlier that this type of survey usually yields a lower response rate, however, it allows the individual to spend their available free time to answer the survey without any external pressure. Besides that, they were given the required flexibility to respond to the questionnaire at any designated time or setting, which indirectly allows them to provide a more accurate response. Mail survey usually allows anonymity of the respondents as long as the information given is kept confidential and used only for the purpose of the research. Anonymity of the respondents and the accuracy of the responses could not be assured if the survey were done through face-to-face interview session (Cooper & Schindler, 2003)

### **Respondents**

The sampling frame for this study is the SME Directory – Bank Negara Malaysia SME info portal (BNM, 2007), provided by United Nations Development Programmes (2007). SMEs were chosen as they tend to be more vulnerable to internal and external environmental forces with larger firms in aspects such as access to resources, financial capital, entrepreneurial traits etc.

individuals were selected randomly to take a survey.

They were including the business owners who work in various sizes of manufacturing firms, which comprises twelve industrial. The list is accurate since it was regularly up to date, included the elements that belongs to target population and there is no duplication of elements. The present study tested the measurement scale by focusing on multi industry in manufacturing sector. This seems to be appropriate sector for the following reasons:

1. Manufacturing SME mostly involved in innovation activities.
2. It has experienced manufacturing technology upgrade and an increasing level of product innovation in recent years.
3. It is adequately large to meet sample size requirement.

sectors. Every firm in the database has had equal chance to be selected based on a systematic random sampling. A self-addressed returned envelope is attached along with the questionnaire.

A number of one hundred and forty one (141) responses were received. Out of that, they were twenty nine (29) firms with no innovation activities and another four were returned unanswered due to change of address. Firms with no

Frequency analyses were obtained for all the firms' data and classification variables. The summary of the analysis are shown in Table 3:

**Table 3: Summary of Frequency Distributions**

No	Profile of Respondents	Valid Percent (%)
1	Firm's age. <ul style="list-style-type: none"> <li>• 0 – 5 years (young)</li> <li>• 6 – 10 years (intermediate)</li> <li>• More than 10 years (old/established)</li> </ul>	17.6 18.5 63.94
2	Company size in terms of annual sales turnover. <ul style="list-style-type: none"> <li>• Small</li> <li>• Medium</li> </ul>	56.5 43.5
3	Company size in terms of full time employees. <ul style="list-style-type: none"> <li>• Small</li> <li>• Medium</li> </ul>	55.15 41.85
4	Industry types. <ul style="list-style-type: none"> <li>• Electrical and electronic</li> <li>• Engineering support industry</li> <li>• Machine and equipment</li> <li>• Food and beverage</li> <li>• Petrochemical and polymer</li> <li>• Rubber products</li> <li>• Textiles and apparel</li> <li>• Transport and equipment</li> <li>• Basic metal product</li> <li>• Life science industry</li> <li>• Wood based</li> <li>• Others</li> </ul>	23.1 3.7 6.5 28.7 6.5 7.4 4.6 4.6 2.8 4.6 4.6 6.5 0.9
5	Firms with R&D Department.	55.6
6	Firms with no R&D Department.	44.4

(financial and non-financial) which has been adapted and modified from previous research (use five-point Likert Scale, ranging from 1 = very low achievement to 5 = very high achievement). A reliability analysis of the 10 items was undertaken and found to be reliable. Cronbach's Alpha Coefficients of 0.889 emerge for the nonfinancial variables and 0.715 for financial variables. This showed that, there is average to high achievements in PIP as in the following descriptive statistics in Table 4:

**Table 4: Descriptive Statistics for Product Innovation Performance (PIP)**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
PIP non financial	108	1	5	3.45	.854
PIP financial	108	1	5	3.57	.783
Valid N (listwise)	108				

Firm's resources variables were measured using 22 items in six dimensions: Physical, financial, human intellectual, organizational, reputational

**Table 5: Reliability Analysis for Firm's Resources**

<b>Dimensions</b>	<b>Cronbach's Alpha</b>	<b>Cronbach's Alpha Based on Standardized Items</b>	<b>N of Items</b>
Physical	0.827	0.821	4
Financial	0.842	0.841	3
Entrepreneurial	0.878	0.878	6
Reputational	0.875	0.876	3
Organizational	0.817	0.818	3
Technological	0.847	0.848	3

Overall, as stated in Table 6, firm's resources given average to high impact on firm's PIP, whereby buildings give the lowest impact and product reputation shows the highest impact on PIP compared to other factors.

**Table 6: Descriptive Statistics for Firm's Resources**

<b>Firm's resources</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
buildings	108	1	5	3.18	1.142
location of buildings	108	1	5	3.26	1.147
physical structure	108	1	5	3.30	1.146
machineries	108	1	5	3.82	1.003
financial capital	108	1	5	3.68	1.214
financial invesment	108	1	5	3.44	1.202
cash from operation	108	1	5	3.66	.997
EO-innovativeness1	108	1	5	3.75	1.086
EO-innovativeness2	108	1	5	3.90	1.012
EO-proactiveness1	108	1	5	3.77	1.189
EO-proactiveness2	108	1	5	3.84	1.1

product reputation	108	1	5	3.93	.983
organizational structure	108	1	5	3.55	.970
organizational culture	108	1	5	3.67	.995
organizational policies	108	1	5	3.60	1.032
held in secret technology	108	1	5	3.68	1.075
new/improved product design	108	1	5	3.55	1.179
unique technological know how	108	1	5	3.88	1.021
Valid N (listwise)	108				

This research wishes to summarize the structure the structure of a set of variables. With that, an exploratory factor analysis has been used. An examination of correlation matrix for both PIP and firm's resources has exceeded 0.3, and so the matrix is suitable for factoring. The following Table 7 show that the Bartlett's Test of Sphericity are significant and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy are far greater than 0.6.

**Table 7: KMO and Bartlett's Test**

Test	PIP	Firm's Resources
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.907	.840
Bartlett's Approx. Chi-Square Test of Sphericity	601.053	1720.786
df	45	.231
Sig.	.000	.000

**Table 8: Communalities of PIP Items**

	Initial	Extraction
regularly of change of PI	.565	.477
new product introduction	.552	.472
PI technically superior	.673	.649
Technological b/through	.555	.457
market response	.584	.554
quality	.660	.649
PI introduction time	.505	.539
profitability	.611	.626
success in gaining market share	.350	.358
improved sales growth	.513	.454

**Table 9: Communalities of Firm's Resources Items**

	Initial	Extraction
buildings	.743	.713
location of buildings	.771	.804
physical structure	.759	.786
machineries	.500	.324
financial capital	.806	.939
financial invesment	.723	.650
cash from operation	.558	.473
EO-innovativeness1	.686	.702
EO-innovativeness2	.703	.687
EO-proactiveness1	.733	.599
EO-proactiveness2	.769	.731
EO-risk seeking1	.734	.709

organizational policies	.639	.612
held in secret technology	.716	.746
new/improved product design	.685	.663
unique technological know how	.679	.585

In reference to the eigenvalues, no factors to be extracted from the PIP items since all of the eigenvalues are lower than 1. The previous factors which represent financial and non financial indicators for PIP suggested to be named “firm’s product innovation performance”. However, five factors to be extracted from the firm resources items because they have eigenvalues greater than 1. If five factors were extracted, then the 66 per cent of the variance would be explained. The rotated factor matrix shows that technological and organizational resources fall under one factor. Technological resources in this research considered to be more on in-house technology (product design, held in secret technology and unique technological knowhow) rather than external technology outside the company. It is not surprising if technological resources have been categorized as organizational resources. From the result, these paper suggestions for the names of the factors are:

1. Reputational
2. Organizational
3. Human Intellectual
4. Physical
5. Financial

the scales are existent and valid in Malaysia context. The above findings are also in line with the RBV point of view that focuses on intangible resources as the main drivers for firm's performance which comprise the element of product innovation as one the performance indicators. Firm's performance can be measured by looking at the differences between firm's profitability and the average profitability of the industry (Villalonga, 2004). The present paper focuses on firm's specific performance that is PIP. Malaysian manufacturing firms have been found gained high profitability from its product innovation. It can be concluded that their achievement in innovation are relatively higher especially through its intangible resources, the product reputation.

Intangible resources such as product reputation are difficult to acquire and develop or replicate by others. Product reputation that mixes up with innovation activities will create excellent product innovation performance as reputation lies in customer's mind. Good reputation creates opportunities for Malaysian manufacturing companies to be more innovative. The performance of product innovation in Malaysian manufacturing companies can be identified through the positive market response and the improvement in the product design itself. Most 63.9% of the companies in this study are more than 10 years since incorporation. Established company is well known in their reputation and also having opportunities gaining more loans and financial assistance for their product

constraints, SMEs also having manpower bottlenecks in terms of few of qualified personell in product innovation.

Among of all resources including product reputation, organizational, technological and human/intellectual, building alone seems to be given lowest impact on firms PIP. However, the strategic location of the building with a proper warehouse, attractive showrooms etc. will affect the performance of product innovation. The location of the building is very important to ensure there are adequate supply of labour and raw materials for production process as resources are the ultimate tools that used by the firms to improve profitability, productivity and innovation. (Montana & Charnov, 2000). In addition, a manufacturing firm must consider proximity to suppliers and customers, as well as local taxes and regulations. This kind of proximity is very practical for ease of communication among the previous listed parties. Good communication among the parties will create good reputation especially for the manufacturing firms which offers products or services. As mentioned before, product reputation will then be the starting point for the firm to add more values to the product in order to create customer awareness and maintaining networking with its suppliers, financial institutions, government and other related parties.

## **Conclusions and Limitations**

The study support RBV point of view which stated intangible resources, particularly “product reputation” as the main indicators for PIP. Product reputation considered to be unique since it was difficult to acquire and replicate by others. Furthermore, reputation is something that lies in customer minds which are abstract and differentiate one firm with other firms. Established firms with larger size having opportunities in gaining product reputation compared to younger firm as there are ease of getting financial assistance and mostly having qualified personnel in product innovation and R&Ds.

Several limitations of this research should be mentioned. First, the study is mainly restricted to the context of study; therefore, it will be problematic to generalize its findings to other sectors. Also, as the ground of this study in PIP is quite new, the data must be interpreted cautiously. The study also constrained by the relatively small data due to the constraint of time. Finally, exploring firm’s resources with PIP in entrepreneurial context in manufacturing firms is a very challenging task especially in getting questionnaire responses from the firm owner. Future research are encourage using qualitative methods focusing in one industrial sector/case study to a better understanding of the nature of product innovation and firm resources.

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