

VALUE CREATION IN R&D

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DECLARATION OF ORIGINAL WORK

“I hereby declare that the work of this exercise is mine except for the quotations and summaries that have been duly acknowledge.”

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I/ we admit this report is sufficient from scope and quality for the purpose of the certificate of Bachelor of Technology Management (Technopreneurship)

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ABSTRACT

This research paper describes the four main value creations for commercialization of R&D (Research and Development) in business and the benefits gained from those values for business company purpose. The four value creations of commercializing R&D to business performance are collaboration, resource management, intellectual property management, and leadership. These values expected to give good impact on company performance, growth and successful in business. The company performance comprises of input, output, transformation and market. The data collection methods involved distributing questionnaires to respondents of R&D-based industry in Malaysia. The research paper identifies what are the R&D value creations involved to give impact on company performance, thus how far the four value creation stated above would be the most appropriate R&D value that would improve the performance in organization.

Keywords: R&D Commercialization Business, Collaboration, Leadership, Intellectual Property Management, Resource Management

ABSTRAK

Kertas penyelidikan menggambarkan empat ciptaan nilai utama pengkomersilan R&D (Penyelidikan dan Pembangunan) dalam perniagaan dan faedah yang diperolehi daripada nilai-nilai syarikat untuk tujuan perniagaan. Empat ciptaan nilai mengkomersilkan R&D kepada prestasi perniagaan kerjasama, pengurusan sumber, pengurusan harta intelek, dan kepimpinan. Nilai-nilai ini dijangka memberi kesan yang baik ke atas prestasi syarikat, pertumbuhan dan berjaya dalam perniagaan. Prestasi syarikat terdiri daripada input, output, transformasi dan pasaran. Kaedah pengumpulan data yang terlibat mengedarkan soal selidik kepada responden R&D industri yang berpangkalan di Malaysia. Kertas penyelidikan mengenal pasti apakah ciptaan nilai R&D yang terlibat untuk memberi kesan kepada prestasi syarikat, dengan itu sejauh penciptaan nilai empat yang dinyatakan di atas akan menjadi nilai R&D yang paling sesuai yang akan meningkatkan prestasi dalam organisasi.

Keywords: R & D Perdagangan Perniagaan, Kerjasama, Kepimpinan, Pengurusan Harta Intelek, Pengurusan Sumber

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LIST OF ABBREVIATIONS AND SYMBOLS

UTeM	= Universiti Teknikal Malaysia Melaka
&	= And
R&D	= Research and Development
PSM	= Project Sarjana Muda
SPSS	= Statistical Package for the Social Science

CHAPTER 1

INTRODUCTION

1.1 Background

Research and development (R&D) are fundamental drivers of value creation and great importance in business (supply management, manufacturing and service industries, domestic and foreign firms, education, and etc.) because the level of competition, production processes and methods are rapidly increasing. According to Wen-Lu and Shiu Hung (2010), Research and Development (R&D) is a well-organized process of knowledge creation, production, diffusion, and application and organized as an important input in strengthening a country's competitive advantage. In addition, it is also one of the most crucial elements in promoting scientific and technological progress of a country. The term Research and Development (R&D) refers to a specific group of activities within a business and the R&D activities usually differ from one company to another. According to Karlsson (2004), he has made a distinction between research and development. Research activities provide the vehicle for measuring the firm's productivity and development, on the other hand is the commercialization of research activities.

According to Amit and Zott (2001), value is generated from productive usage and combination of complementary and specialized resources and capabilities. The concept of value can be understood in various ways. According to Walter (2001), value is defined as a trade-off between benefits and sacrifices. According to Priem (2007), value creation can be defined as innovation that establishes or increases the consumer's valuation of the benefits of consumption. When the value is

created, the consumer either (1) willing to pay for benefit gained, (2) will be willing to pay for something that perceived to be better, or (3) will choose to receive a previously available benefit at lower unit cost, which often results in a greater volume purchased.

There are different indicators for measuring the value creation in R&D (from new knowledge creation, increasing profit and market value for the firm, sales, growth, develop better product or creation in new product, creation of links among organizations and capacity building (e.g. facilities, training of higher quality human resources, expertise and etc.). According to Luio (2005), R&D also has indirect impacts and drivers for economic development.

Results in R&D can have a direct impact on value added. For instance, a firm R&D department invents a new production process that significantly saved the raw materials required for production the final products. According to Eric and Paul (2008), that is, for the same amounts of raw materials, labor, capital and other inputs, the firm can produce higher value added and at the same time can reduce the cost. It will benefit both the firm and consumer.

In this research, the researcher examines the value creation in R&D applied in business that gives impact on company performance.

1.2 Problem Statement

Nowadays, many business companies do not able to survive in market in the long run, because these entrepreneurs in business companies do not able to compete with their competitors due to lack of Research and Development (R&D). They do not implement R&D value creation in their business. These entrepreneurs have ideas to implement the new products, however, they do not apply value creation for that particular product in their business. Furthermore, they do not apply value creation concept in their business and management and operation.

On the other hand, companies that apply R&D at a very minimum level, the find it difficult to sustain their business, and these companies are always being left behind. To avoid being left out of this globalization market, businesses need to be able to use on new knowledge, expertise, and intellectual property to remain competitive with higher value added products and services, hence can improve company performance.

1.3 Research Questions

This research would seek to answer the following questions:

- i. What are the values created in R&D?
- ii. How far R&D value creation able to give impact on company performance?

1.4 Research Objectives

- i. To identify the value created in R&D .
- ii. To identify which of the R&D value creation that give impact on company performance

1.5 Scope and Limitation

- i. The scope of this study is focused only on the of R&D values to business.
- ii. This research study describes the value creation in R&D and benefits of these value to business and company performance.

1.6 Summary

In the research study, it focuses on the value creation of R&D to business and benefit gained from these values onto company performance. This is followed with problem statement, research objective and research question, scope and limitation use in the research. Research and Development (R&D) is important for any industry to develop competitive advantage from their goods and services and gain high profit when producing a great technology. Now many industries are aware about the importance of R&D to selling their goods and services and also right now, customer has already accepted the usage of sophisticated technology used in business. The aspects of value creation in R&D are collaboration, resource management, intellectual property management and leadership. It is important to provide guideline for industry or innovators to commercialize their goods and service to market thus, achieved a good performance and good respond from their innovation created.

CHAPTER 2

LITERATURE REVIEW

2.0 Value creation

Value creation is known as the development of new products and services which increase the utility that the customers obtain from them. According to John Arild and Olsen (2010), in the 21st century, due to rapidly moving to global knowledge economy, many organizations now continue focus on value creations within the mental models, systems, and organizational solutions. They agreed on the Marthing Sanden and Edvardson (2004), which “value is defined and co-created with the customer and determined by the customer on the basis of value-in-use, rather than being embedded in predefined output. According to Priem (2007), in addition, value creation involves innovation that establishes or increases the customer’s valuation from the benefit of consumption. There are four values in R&D that can be applied in business such as collaboration, resources management, leadership, and forecasting.

2.1 Collaboration

These days, collaboration plays an important role in research and development activities, and has urged the research into their effects of the firm’s strategic decisions and as a result it will increase the performance of the firm. Besides, R&D collaboration is a means to increase the impact of R&D on economic growth through enhanced R&D productivity and technological diffusion.

The benefits of collaboration in R&D are great, especially to the high-tech firms: which the collaboration helps firms to create new markets, gain skills and technologies, realize economies through reorganization and exploitation of complementarities, share the costs and risks, and control competitive forces (Veugelers, 1998). According to Cristina Bayona, Teresa Garcia and Emilio (2000), collaboration or cooperation has been studied from a number of different perspectives, for instance, from industrial organization, game theory, transaction cost theory, organizational theory or strategic management, which occasionally offered the contrary arguments when seeking to explain it. According to Herman, Negassi, Belderbos (2004), the determinants of the R&D collaboration generally include spillovers, absorptive capacity, complementarity, heterogeneity, firm size, market share, R&D intensity, human capital, technological transaction, appropriability, and public subsidies.

2.1.1 Venture

These days, venture in business plays an important role in research and development activities, and has caused the research into their impacts of the firm's strategic decisions/planning, hence it will increase the performance of the firm. Besides, venturing business in R&D is as means to increase the impact of R&D on economic growth through enhanced R&D commercialization activity and technological diffusion.

The choice of different types of partners (customers, suppliers, competitors, public research organizations) by firms will presumably be affected by the importance of each of these factors in different industries, by the nature of R&D projects (whether the purpose is using the science to develop new commercial applications or solve complex problems, developing or adapting complementary innovations, setting standards), and by the cost of setting up a particular partnership (Cassiman, 2005).

Dal, Emma, Steve (2003) pointed out the benefits of venture in R&D are great, especially to the high-tech firms: which in the business venture, it helps firms to increase capacity, share skills and technologies, reduced set up time, reduce process

time, and share the costs and risks. According to Garcia (2000), venture in business has been studied from a number of different perspectives, for instance, from industrial organization, game theory, transaction cost theory, organizational theory or strategic management, which offered the contrary arguments when seeking to explain it.

First, the researcher has reviewed the theoretical literature on the reasons that why the industrial firms decide to enter into venture R&D agreements. According to Sakakibara (1997), the motivation for collaboration in R&D is related to the technological complexity and the objective of risk sharing and obtaining the financial resources. Moreover, due to the change in concept of innovation, between the firm and other external agents (industries), means that venture in R&D for commercializing purpose as today, is viewed as a vital option for the survival of the firm (Hausler, 1994).

According to Wang (1994), venture of the firms with other sectors is to gain an access to a new technological knowledge, licencing business, and training in the firm According to Roberstson and Gatignon (1998), besides, due to increase in the level of complexity (globalization) and knowledge that is needed, thus it become necessary even for the most diversified firms to venture with others in order to achieve goal and the scope economies and to response quickly in the market place. According to Shing (1997), however, when the technology becomes more complex, the greater the search done by the firm for alternative business venture. Shakakibara (1997) has found that the most important motives for becoming part or cooperation are gaining access to the complementary knowledge of the partner and entering new technological areas.

However, the cost of establishing and monitoring the private partnerships may be smaller when joint R&D projects is well defined, close to the market and relatively short-term (Cassiman, 2005).

The main problem for the top managers of the company is to find the right partners. Nieves Arranz and Carlos Fdez (2008) has developed a framework to examine the determinants for the choice of partners among firms which cooperate in R&D. They used the resource-based perspective to predict the relative efficiency of

cooperation with different types of partners to lead to the improvement of the economic and technological potential of firms involved, and at the same time can increase the level of competitiveness of countries. In their study, they have divide partners into two category; vertical R&D cooperation (customers and suppliers) and horizontal R&D cooperation (competitors or rivals).They have considered that vertical R&D, is the most common when the objectives of R&D are more novel and complex, or when the market for R&D results is poorly defined. This gave meaning when both consumers and suppliers provide complementary knowledge resources for the development of new products or for the entry of those products in new markets. Besides, they indicate that the cooperation with rivals (horizontal R&D cooperation) will be more frequent in high-tech sectors compared to mid and low technology sectors.

2.1.2 Licensing

According to Entrepreneur Media, Inc. (2013), a business arrangement in which one company gives another company permission to manufacture its product for a specified payment. There are few faster or more profitable ways to grow your business than by licensing patents, trademarks, copyrights, designs, and other intellectual property to others. Licensing lets you instantly tap the existing production, distribution and marketing systems that other companies may have spent decades building. In return, you get a percentage of the revenue from products or services sold under your license. Licensing fees typically amount to a small percentage of the sales price but can add up quickly.

On the other side of the coin, you could be the one with the interest in licensing the high-recognition brand name of another company. To many, it might seem like the key to a gold mine is Putting a Notre Dame logo, a Lion King character or a Star Wars graphic on your product means guaranteed success, right? For a sure thing, prepare for a frustrating search. But if you're willing to put some time and effort into making your product work, buying the licensing rights to a well-known product or name can substantially increase your chances for success.

Licensing is a billion-dollar retail market worldwide. But a license is not a prescription for instant success. It gives you the borrowed interest of a name that is either unique or has some consumer acceptance, but it still takes good selling and marketing to succeed. A license is, in essence, a tool, and when used well, it's an extremely cost-effective marketing tool.

Licensing offers three major advantages. First, it may make you have something unique that your competitors don't. Second, it may mean getting a little better margin because it is unique. And third, it may be seen that ten percent of the retailers you call on that you've never been able to sell to will finally take a look because you have something different. And when that happens, you can sell the rest of your line.

According to Advanstar Communications Inc. (2013), Licensing is the process of leasing a legally protected (that is, trademarked or copyrighted) entity in the form of a name, likeness, logo, trademark, graphic design, slogan, signature, character, or a combination of several of these elements. The entity, known as the property or intellectual property, is then used in conjunction with a product. Many major companies and the media consider licensing a significant marketing tool.

Licensing is a marketing and brand extension tool that is widely used by everyone from major corporations to the smallest of small business. Entertainment, sports and fashion are the areas of licensing that are most readily apparent to consumers, but the business reaches into the worlds of corporate brands, art, publishing, colleges and universities and non-profit groups, to name a few.

Licensing can extend a corporate brand into new categories, areas of a store, or into new stores overall. Licensing is a way to move a brand into new businesses without making a major investment in new manufacturing processes, machinery or facilities. In a well-run licensing program, the property owner maintains control over the brand image and how it's portrayed (via the approvals process and other contractual strictures), but eventually reaps the benefit in additional revenue (royalties), but also in exposure in new channels or store aisles.

2.2 Leadership

Company performance begins with the commitment of senior company officers and the development of a mission and strategy that will be implemented. Having the CEO and other senior corporate officers set the tone at the top is critical but not sufficient on its own. Thus, a good leader must show his/her employer to obtain a good decision making, the leader must unite with all employees to form a team advisors (Wong, 2008).

A company mission statement should be adopted to address the corporate commitment throughout the organization. Commercialization activity strategies are then developed to move the company toward a full integration of impact of R&D. Such move must be seen as a core corporate value, central to company operations, rather than as a reaction to current or pending governmental regulations. Implementation must continue through:

- Broad-based institutional support for the company strategy
- Development of an organizational structure to support sustainability
- Development of costing, capital investment, and risk management systems
- Performance evaluation and incentive systems
- Measurement and feedback systems
- Reporting and monitoring systems

2.3 Resources Management

2.3.1 Capital needs and seed capital

According to WebFinance, Inc. (2013), the total financing needs (Long-term capital + Working capital) of a firm arising from its current and future plans. The cash available is for day-to-day operations of an organization. Strictly speaking, one borrows cash (and not working capital) to be able to buy assets or to pay for obligations. It is also called current capital.

Accounting means net liquid assets computed by deducting current liabilities from current assets. The amount of available working capital is a measure of a firm's ability to meet its short-term obligations. Sources of working capital are net income, long-term loans, sale of capital assets, and injection of funds by stockholders. Ample working capital allows management to take advantage of unexpected opportunities, and to qualify for bank loans and favorable trade credit terms. In the normal trade cycle of a company, working capital equals working assets. It is also called net current assets.

According to WebFinance Inc (2013), money used for the initial investment in a project or startup company, for proof-of-concept, market research, or initial product development which is also called seed financing or seed money.

According to Sheehan Finney (2013), counsel can typically play a very helpful role in structuring and closing an offering of seed capital. If counsel is consulted early in the process, he or she can advise the manager of an emerging business about what its capital structure should look like, the type of investor that is most likely to be interested in participating in the offering, what type of investment instrument is most appropriate for the offering, how to structure negotiations with investors most efficiently and advantageously, how to make sure that the offering meets all of the requirements of the relevant legal exemptions and how to make appropriate disclosures to the investors.

2.3.2 Professional Needs

According to Alan Norton (2010), he described that you may be a brilliant developer, or a highly skilled net admin, but if you're unprofessional, your career is likely to fall short. Alan Norton offers some attributes to strive for.

The term professional is thrown around quite a bit these days, perhaps too much. He does it himself. However, what exactly does it mean to be a professional? As you read through the items below, consider how you compare with each trait.

- Put customer satisfaction first

Understanding and satisfying your customer's needs are the cornerstones of a successful business. Do what is necessary to meet those needs. After all, without the customer, there is no professional. You may not view those you work with as your customers, but in many cases, they are. Alan remembered when one of my managers perceived that he was overly stressed. His manager pulled him aside and sat him down in his office where he told Alan stories and jokes for the better part of half an hour. His manager recognized Alan's needs and acted accordingly. Professionals identify and satisfy their customer's needs.

- Make expertise your specialty

The very word professional implies that you are an expert. Technical competence is essential in IT. It is important to become an expert in the skills and tools necessary to do your job. You must always perform to the best of your abilities. Keep your knowledge up to date. Professionals know their trade.

- Do more than expected

Professionals aren't bound by a time clock. They are given wide latitude in their daily self-management. They are expected to manage their time and work habits.

Don't abuse the privilege. If you take an hour for personal needs, give back two hours. The reality is that professionals are expected to exceed the standard 40-hour workweek. There are times when you may be asked to work weekends. You may have to go for a vacation or work 12-hour days to complete an important project. All are part of the job description of most professional positions. Professionals are expected to produce results. Strive to complete deliverables before their due dates and under budget. Professionals meet or exceed expectations whenever possible.

- Do what you say and say what you can do

This is one of Alan's favorite sayings especially in view of the fact that talking the talk is so prevalent and walking the walk so rare in this age of sound bites. You should "engage brain" before speaking, for example, can you really do what you are about to say? If you do not able to do so, the wizard behind the curtain will eventually be revealed and hard-earned trust can be lost. Professionals deliver on promises made.

- Communicate effectively

Alan goes to patronize a dentist who has excellent communication skills. The dentist takes the time to explain the available options, make recommendations, state the total costs, and promise a date when the work can be completed. Alan then feel empowered to make the right decisions. Alan recently ordered Internet and phone service from the cable company. He told the salesman that the existing cable had been ripped out during a landscaping project. Perhaps Alan was not clear or perhaps the salesman was not listening, maybe it does not really matter. The message didn't get through and the wrong person was sent to do the installation. As a result, Qwest, not the cable company, got Alan's business. Not only did the commissioned salesman lose his sale, he and his company both looked unprofessional in Alan's eyes. Resist the urge to blame the customer when communication goes awry. Effective communication is ultimately your responsibility, not your customer's.