Organizational Internal and External Resources as Drivers of Success in Product Development: A Conceptual Model

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Abstract

Successful products are those that can meet customer needs, wants, and expectations. The ability of an organization to produce successful products is strongly influenced by the availability of its internal and external resources. This study manages to build a conceptual model that describes the influence of organizational internal and external resources on product success. The four internal resources that drive successful products include product characteristics, management & organizational characteristics, innovation, and knowledge sharing, while one external resource includes marketplace characteristics. The conceptual model can be used as one of the basic references for measuring the driving aspects of the success of product development in subsequent studies.

Keywords: product success, internal resources, external resources

1. Introduction

The ability of a company to translate consumer needs into product attributes will determine the success of a product. Product attributes are product characteristics that ensure that the product can satisfy the needs, wants, and expectations of its buyers.[1] The ability of an organization to produce successful product attributes is influenced by the availability of internal and external resources as well as other factors. Based on the literature review, an organization's internal resources in creating a successful product can be explained by the Resource-Based View (RBV) Theory, while the organization's external resources are explained by the Industrial Organization (I/O) Theory. Both theories are able to explain why the final results of an organization's efforts to achieve success may be different from others as their resources are also different.

The RBV Theory considers the internal strength of an organization as its competitive advantage. If the internal resources in the organization are well managed, it will have an impact on increasing organizational performance. Organizational internal resources can be tangible and intangible assets. Tangible assets are in the form of organizational physical resources such as people, land, buildings, machinery, and equipment. Intangible assets are in the form of non-physical resources such as reputation, trademark, intellectual property, knowledge, and organizational culture. Every organization is believed to have different tangible assets and

intangible assets, which causes the results of organizations' performance different from each other.[2-4]

The RBV theory explains that an organization can achieve a sustainable competitive advantage once it has valuable, rare, imperfectly imitable, and organized resources. This concept is known as the V-R-I-O framework. An organization can obtain its advantage when the resources are only owned by the organization and are difficult to imitate by competitors. As long as the resources possessed by an organization are immobility, the organization's superiority can last a long time.[3–5]

On the organizational external factors, product success is explained using the Industrial Organization (I/O) Theory. In this theory, the source of organizational competitive advantage comes from an attractive market from which there are four forces that drive global market orientation, namely market, government, costs, and competition.[6] The I/O Theory highlights the aspects of market entry and exit barriers, especially those relating to economic scale, organizational location, exclusive products, or binding agreements with suppliers, as the sources of organizational competitive advantage.7

The current study thoroughly searched the literature on variables contributing to organizational internal and external factors which have an impact on product success based on Resource-Based View Theory and Industrial Organization Theory. This study also introduces a conceptual model which describes the influence of internal and external factors on the success of product development. This conceptual model can be used as one of the basic references for measuring the driving aspects of the success of product development in subsequent studies.

2. Methodology

This study began with a question: what variables do influence the success of a product? To answer this question, a literature search using the keyword "product success" was performed on reliable sources, including ScienceDirect (Elsevier), ABI/Inform (ProQuest), Springer Link (LNCS), Web of Science (ISI), EmeraldInsight, IEEE Xplore (IEE Electronic Library), and SAGE. These sources are trusted because they have a good reputation in the fields of science and technology and are widely known. The literature search was also limited to 30 years, i.e. from 1987 to 2017. The time limit for this publication was intended to see the trend towards research on successful products over the past 3 decades. The literature search also paid attention to the country/region of origin of the data source, i.e. the Asian, European and American regions, in order to obtain a comprehensive picture of conditions in different countries.

The literature search on the other Scopus websites, e.g. by using the article title, abstract, and "product success" keyword, found 699 documents. The subsequent search was then minimized on the keyword only and found 147 documents (data accessed on February 10, 2017). The frequently-arising research topics included product design, marketing, innovation, product development, project management/NPD project, customer satisfaction, competition, strategic planning, sales, product performance, customer need, and organizational learning. These findings were then analyzed using VOSviewer software. The results of research mapping using VOSviewer software as illustrated in Figure 1 provide an overview of research topics that correlate with successful products.

Figure 1. Visualization of research on the network data-based successful products

The in-depth literature search obtained several variables that have a direct correlation with product success. These variables were then identified and grouped into five independent variables (variable X) and one dependent variable (variable Y). The five dependent variables included product characteristics, management & organizational characteristics, marketplace characteristics, innovation, and knowledge sharing, while the dependent variable was product success. The selection of these variables has also been performed by Lasalewo et al (2018)[8] in which various successful product variables were grouped and sorted by weight using the tabulation technique and meta-analysis correlation method. In the tabulation technique, 16 variables were found to be correlated with product success. Such identification was done using a value of 1 and a value of 0 in which the value of 1 was only given for variables found in the main literature, which were then sorted according to the occurrences level. In the testing using the correlation meta-analysis method, the relationship between independent and dependent variables was tested using the value of correlation coefficient which statistically indicated the strength of the relationship between the research variables.

In the current study, the five independent variables X were grouped into organizational internal and external factors and converted into predictors. The relationship of the five independent variables with the successful product was defined as a conceptual model. The conceptual model in this study was a model derived from theories, theoretical concepts, and ideas developed by previous experts or researchers to be further examined.[9] Overall, the stages of this study are explained in Figure 2.

Figure 2. Stages of the study

- Research questions:

1. What variables do affect the success of a product?
2. What are the roles of organizational internal and external resources in product success?

- Search for variables that influence product success on reliable sources (publications in the last 30 years)
- Identify five research variables that have an impact on product success, and group them into internal and external factors
- Transform research variables into predictors
- Build a conceptual model that describes the relationship between research variables and their effect on product success.

3. Results and Discussion

Based on the results of an in-depth literature review, there are internal factors and external factors that affect product success. The organizational internal factors are explained by the resource-based view (RBV) theory, while the external factors are explained by the industrial organization (I/O) theory. Both of these factors consist of research variables. The internal organizational factors are broken down into four variables, i.e. product characteristics, management & organizational characteristics, innovation, and knowledge sharing. The organizational external factors are explained in one variable, i.e. marketplace characteristics. The relationship of these research variables with product success is explained through the conceptual model as shown in Figure 3.

Figure 3. Conceptual model of the relationship of organizational internal and external resources with product success

Lasalewo et al's study (2018) using tabulation and correlation meta-analysis methods found 16 variables which influence product success. This study produced five main variables that have a major influence on product success. The relationship between research variables is expressed through seven research propositions.

The current study begins with mapping and grouping previous publications on "product success" using VOSviewer software and then conducting a literature review using the systematic literature review (SLR) technique. The use of VOSviewer software is useful for

visualizing scientific publications based on the network data which are compiled based on the keyword cluster "product success". Mapping scientific publications using VOSviewer software provides an overview of the research topics (variables) related to successful products. Afterward, the research variables are grouped into internal and external factors by employing the SLR technique. The systematic review technique can help researchers to be more focused, systematic, directed, and avoid research bias.[10] The process of reviewing the SLR technique consists of three main stages, i.e. collecting references from reliable sources, choosing the appropriate references based on certain criteria (title, keywords, and abstract), and reviewing the main references used in the literature review. The research variables that have been grouped into internal/external factors are then transformed into predictors.

3.1 Organizational Internal Factors

Organizational internal factors that affect product success consist of four variables, including product characteristics, management & organizational characteristics, innovation, and knowledge sharing. Both product characteristics and innovation are internal organizational resources that cause organizational outputs (products/services) to be valuable, rare, imperfectly imitable, and non-substitutable. Internal resources in the form of knowledge sharing are valuable and rare as well as have unique characteristics. Meanwhile, the management & organizational characteristics describe an organization's management capability that translates all internal organization resources into successful products.

If various internal resources within an organization, both tangible and intangible assets, are managed properly, they can improve the organization's performance.[3–5] As long as the organization's resources are immobility, product success and company performance can be maintained.

3.1.1 Product Characteristics

Product characteristics include all elements related to the character inherent in the product. The product characteristics variable is converted into four predictors, i.e. product advantage, the product meets customer needs, product price, and technological sophistication.[11,12,21,13–20]

The product advantage can be described as the superiority of a product compared to other similar products on the market, especially on the dimensions of quality, benefits and product functions.[14] The product will be superior if it has attributes that are in accordance with consumer needs and are able to meet the expectations of its buyers (product meets customer

needs). The process of identifying this 'product meets customer needs' can be done in various ways, including canoeing technique, QFD (quality function deployment), or the integration of both.[22] QFD is a communication tool between team members involved in a product development project, which can translate consumer needs and wants into a product/service. Through QFD, the product development team can solve problems in a more structured way.

The technological sophistication predictor is a measure of technological sophistication used in developing new products.[11,12] The use of technology will have an impact on product quality because the better the technology used in product development, the better the quality of the products produced. The use of this technology can solve complex processes and significantly reduce product development time.[23]

Through this product characteristics variable, product superiority can be realized through offering innovative product features that actually escape the attention of competitors.[1] In addition, the application of eco-design to products has influenced product success.[24,25] Various predictors of product characteristics indicate that there are many aspects that affect consumers when choosing a product, which eventually has an impact on product success.

3.1.2 Management & Organizational Characteristics

Management & organizational characteristics can be described as a policy system and a capability to manage organizations so they are able to create quality products. This variable consists of eight predictors, including organizational climate, organizational design, external relations, degree of centralization, degree of formalization, advanced teamwork, cross-functional integration, and top/senior management support.[4,11–14,16,17,19,20,26–32]

The organizational climate predictor indicates internal organizational conditions related to culture, norms, and values of trust that are believed by each individual in an organization. It is this value or norm that collectively shapes the character and behavior of individuals in an organization.[33] Organizational culture is an important aspect because it determines the success or failure of an organization. The survey conducted by Earnest and Young Knowledge Management International Survey (1996) on 431 senior executives found that 80% of failures in the implementation of knowledge management were caused by organizational culture factors. The organizational culture has a significant influence on individual decisions to share knowledge, build trust, and maintain the spirit of teamwork.[34]

The organizational design predictor shows the design of organizational forms, including reward system and work design.[11–14] Formal incentive structures, as well as reward systems, are the main factors that shape the employees' attitude towards sharing their knowledge with

their colleagues.[35] The incentive system and organizational culture can be used to stimulate cross-functional employee behavior towards collaboration on creating new products, especially in large companies.[36,37] The results of a survey of 467 employees in four public organizations also show that expected reward, expected association, and expected contribution are factors that influence employee attitudes towards cooperating with colleagues.[38]

In addition, organizational characters that influence the employee character are described as predictors of the degree of centralization and degree of formalization. The centralization prevents employees from making decisions.[39] Conversely, the social interaction that is not limited by rigid formalization will have a positive impact on knowledge sharing activities, which allow individuals to accumulate their knowledge, thus gaining new knowledge.[4,40]

The advanced teamwork predictor can be analogous to a group of individuals who interact adaptively, dynamically, and interdependently to achieve an organization's shared goals, where each team member is given a specific job role.[11–13] The members of the new product development team, which come from various fields of expertise such as product design, manufacturing engineering, production engineering, environment, and marketing, work together to produce new products. The organizational strength lies precisely in the superiority of individuals to collaborate in exchanging their knowledge during a new product development project.[41] Frequently, members of the product development team are not in the same location, but the existence of information technology has helped the team members work more effectively, for example by implementing Computer Integrated Manufacturing.[42]

The cross-functional integration predictor illustrates the participation level of the product development team composed of cross-function in initiating new products.[11–13] Today, many companies in Japan, Europe, and North America rely on cross-functional teams to develop new products.[43] The number of product development team members varies, ranging from several to hundreds. For instance, a project conducted by the Yahoo! portal only involves 13 developers, while the IBM computer development project involves 200 people on average.[44] In such product development activities, the cross-functional team members often join other groups without having certain structural relations.[45]

3.1.3 Innovation

The ability to innovate is an organization's internal resource that encourages the creation of successful products and plays an important role in increasing the productivity of the company.[46,47] The ability to innovate is considered as a means of increasing organizational profits because through continuous innovation, successful products will be produced.[48,49]

Through innovation, an organization can implement new ideas to create positive values for the organization.[47] Innovation activities can lead a company to focus on its mission to create new opportunities.[50] Innovation activities are positively correlated with the increased organizational performance.[48,49] Results of the meta-analysis study indicate that innovation activities can improve organizational performance, especially in Small and Medium Industries.[51,52]

In this study, innovation consists of two predictors, namely product innovation and process innovation. Product innovation means the number of products/services produced in an organization, while innovation processes are described as the number of changes in the production and distribution processes performed by an organization.[47–49]

31.4. Knowledge Sharing

Knowledge sharing describes a social interaction that involves the exchange of knowledge, experience, and skills of individuals (employees) inside and outside the organization. Knowledge sharing also explains the level of someone's positive feeling of their coworkers. The employees' knowledge and skills as personal intellectual capital have great potential for creating values in an organization.[28,41,53,54]

There is a belief that organizational performance will increase if the individuals have the desire to share knowledge in the form of information, practice, insight, and experience. The knowledge possessed by individuals in an organization is the most strategic resource since by having intellectual capital, an organization will have superior resources than its competitors.[28,53,54] The success of an organization is supported by individuals who mutually exchange diverse knowledge and collaborate synergistically in achieving organizational goals.[41]

The Delphi Group study shows that 70% of an organization's knowledge assets lie in the minds of its employees, while 30% are in an externalized form.[55] The employees' behavior towards exchanging their knowledge results in a cycle known as sensemaking, i.e. people listen to other people's conversations, communicate with each other, and then create an understanding of new knowledge obtained when they are working.[45,56]

Knowledge sharing has a positive correlation with product development, even knowledge about product development will develop exponentially when knowledge sharing activities occur.[57] Knowledge sharing in an organization is needed by the product development team to communicate consumer needs with the technical knowledge related to the organization's

internal capabilities, which are then used to develop new products. This knowledge sharing results in integrated product development.

The knowledge sharing variable is explained in two predictors, i.e. knowledge donating and knowledge collecting. Knowledge donating is an individual process of sharing their personal intellectual capital with other people in an organization, while knowledge collecting is an individual process of gathering knowledge that is deemed useful from their colleagues.[53,54,58–60] Knowledge sharing is an organization's internal strength that is very valuable, rare, and must always be maintained because the desire to share knowledge between individuals is not always present in every organization.

3.2 Organizational External Factors

External factors in this study are represented by marketplace characteristics variable that affects product success and have a significant impact on organizational performance. Marketplace characteristics are elements that include target markets, market potential, competitive activity, and competitive intensity (e.g. turbulence) as a reaction to new products.[11-14] Marketplace characteristics in this study emphasize four predictors, i.e. market orientation, customer input, market potential, and environmental uncertainty.

The market orientation predictor is described as an organizational orientation towards the internal environment, competitors, and customers. Market orientation describes the organizational norms and values which encourage the organizational behavior towards the market environment.[11–15,61] An investigation of 126 companies in the Netherlands employs market orientation as one of the predictors for measuring the performance of new products. The results of the investigation indicate the impact of the market orientation on product success and overall organizational performance. In addition, the predictors of product advantage and launch tactics are also used to predict product success.[15]

The market potential predictor is described as a form of organizational anticipation of the growth of customers in the target market.[11-14] A meta-analysis study shows a very strong positive relationship between market potential and product success opportunity.[14] This reinforces the notion that the market potential has a very significant effect on product success in the market, especially in the North American, European and Asian markets. Besides market orientation, other aspects that need to be considered include marketing & technological synergies, pre-development proficiency, and technological proficiency.[14]

The environmental uncertainty predictor is a measure of the level of uncertainty in the market environment faced by companies, such as regulation and technology. It is a condition

when an organization only has little information about its external environment that is always changing so most of it is difficult to predict.[11–14] The relationship of environmental uncertainty (consisting of demand uncertainty, technological uncertainty, and company threats) with firm performance has been examined in IKM in Malaysia.[62]

Based on the previous studies, the current study shows several variables and predictors that influence product success. This study is the first step to measure the extent to which the influence of internal and external factors on product success and identify which variables predominantly affect product success. As a comparison, a study conducted by Rothaermel (2012)[63] shows that organizational internal factors have a greater influence than the external factors. The influence of internal factors is 30%-45% on organizational performance, while external factors only affect 20% of organizational performance. Meanwhile, the other 35% - 50% influence comes from other factors that are explained by these two factors. Nevertheless, a review conducted by Rothaermel (2012) is limited to showing only the influence of these factors on organizational performance, not the effect on product success.

4. Conclusions and Implications

The ability of an organization to produce successful products is strongly influenced by the availability of internal and external resources. The current study summarizes various previous studies regarding organizational internal and external resources as the drivers of product success. This study suggests that there are four internal resource variables, i.e. product characteristics, management & organizational characteristics, innovation, and knowledge sharing, and one external resource variable, i.e. marketplace characteristics. These variables are then converted into predictors of product success.

The internal resources are explained using the RBV theory which emphasizes that tangible assets, intangible assets, and organizational capability are an organization's strengths in producing successful products. If these three assets are managed well, not easily imitated, and immobility, a company with these resources can achieve sustainable competitive advantage. The organizational external resources are explained using the I/O theory which reveals that the source of organizational strength comes from an attractive market. These external strengths, among others, are indicated by predictors of customer input and market potential.

This study manages to incorporate variables and predictors into the organizational internal and external factors and show their impact on product success. Through an in-depth literature review, this study also builds a conceptual model that can be used by the future studies

to measure the influence of organizational internal and external factors as well as their impact on product success.

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