

Measuring Product Success: A Literature Study

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Measuring Product Success: A Literature Study

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Abstract - Previous studies of successful products have revealed three variables that directly contribute to the product success, including product characteristics, management & organizational characteristics, and marketplace characteristics. In addition, there are two variables that contribute indirectly to the product success, i.e. innovation and knowledge sharing within an organization. The objective of the current literature study is to construct a theoretical model that describes the correlation of these five variables with the product success. The model was formed through a deep literature search, which evoked all aspects (variables) contributing to the product success. The current study successfully produces a model that can be used to assess the product success, which is then tested using seven research propositions.

Keywords - Successful product, theoretical model, proposition.

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I. INTRODUCTION

The success of a product highly affects the business performance of an organization/company. The success of a manufacturing company's business results from its ability to identify customer needs, then immediately create products that can meet such "needs" at a low cost [1]. Creating customer need-based products will have an impact on the product success. Through successful products, a company can increase its revenue by more than 25% within three to five years [2].

Successful products are shown by their performance in generating high profit and sales, broad market share, or relatively short payback period. The product success can be measured through three main aspects, namely financial performance, opportunity window, and market impact [3], [4]. The product success can also be measured using sixteen product success indicators grouped in four main factors, namely (1) financial performance; (2) objective customer acceptance; (3) technical measures; and (4) subjective customer acceptance. These four factors represent various aspects of product success, such as customer satisfaction, profitability, revenue, and product performance [5]. It is important to note that product success should not be measured only by using one success indicator, but should be measured together with other indicators [3], [6]. The current study uses four indicators together to measure the product success, namely profitability, domestic market share, foreign market share, and sales objectives.

Predicting product success is very important as some studies have shown that not all products developed by a

company succeed in the market. A new product development project is highly risky, costly and not guaranteed to be successful in the market [7]. The Project NewProd reports that out of 100 products developed by companies, 21.9% fail when launched, 18.7% fail when reaching the market, and only 59.4% succeed in the market [8]. In addition, the Product Development and Management Association (PDMA) Survey reveals that the average failure rate of new products reaches 41%, and on average only 1 of 6.6 products is successful in the market [9]. A study conducted by Urban (1980) even suggests that 35% to 44% of total products introduced by producers to consumers are failed products [10].

Based on the research on product success and failure, it is necessary to build a model that can be used to analyze the aspects/variables that impact on the product success. Through this literature study, a proposed theoretical model can be used to predict the product success. The current study began with identifying the variables affecting the product success through trusted sources, such as IEEE Xplore, ScienceDirect, EmeraldInsight, ProQuest, Web of Science, and SpringerLink, with a publication span from 1987 to 2017.

The results of literature search using the keyword "product success" found variables that correlated with the product success, including product development speed, technological capability, firm strategy, market environment, product characteristics, organizational characteristics, marketplace characteristics, and knowledge sharing activities. The results of this in-depth literature review were then grouped into five variables, i.e. product characteristics, management & organizational characteristics, marketplace characteristics, innovation, and knowledge sharing.

II. METHODOLOGY

The methodology and steps in this study are described in Figure 1. The idea of this study began with a question: what are variables contributing to or playing a role in the product success? This is important because the product success has a major impact on the company's success. To answer the research question, this study performed an in-depth literature review based on the results of previous studies. The search on trusted sources such as IEEE Xplore, ScienceDirect, EmeraldInsight, ProQuest, SpringerLink, using the keyword "product success" found 147 documents discussing the product success (data accessed on February 10, 2017).

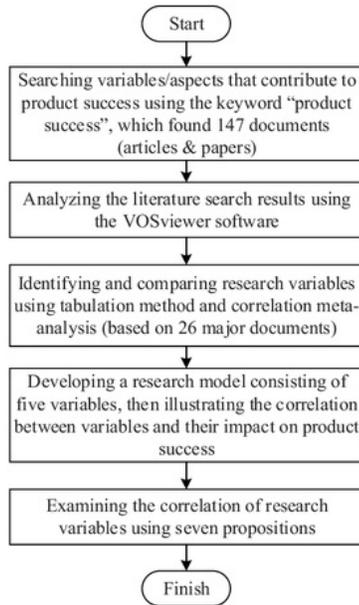


Fig. 1. Research steps

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The findings were then analyzed using the VOSviewer software to visualize the data network-based research map. These data were organized into several clusters, including scientific journals, researchers, research organizations, countries, or keywords. The use of VOSviewer software was aimed to analyze the bibliometric network data [11]. The identification results found 16 variables that correlate with product success.

The subsequent identification used the tabulation method and correlation meta-analysis. The tabulation was performed to facilitate the identified variables to be easily compiled, summed, and analyzed using tally, while the correlation meta-analysis was to obtain the distribution correlation of independent variables X (those contributing to product success) with the dependent variable Y (product success). The correlation meta-analysis is described in Figure 2. In the correlation meta-analysis, the used values were taken from the correlation value (r_i), or the converting result of F , t or d values from the previous studies into the r_i value. This conversion was done to facilitate the observation of the correlation between research variables [12].

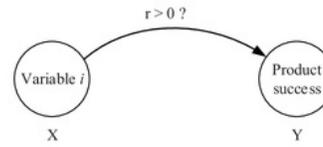


Fig. 2. The correlation meta-analysis of successful products

The results of data processing using the tabulation method and correlation meta-analysis were then used to construct a research model that describes the correlation between research variables and their impact on the product success. This model consisted of five independent variables X and one dependent variable Y, which was subsequently tested using seven propositions.

III. RESULTS

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A. The Process of Identifying Research Variables

The process of identifying research variables using the tabulation method found 16 variables that correlated with the product success. The identification was performed using scores 1 and 0, in which score 1 was assigned to variables that were found/discussed in 26 major documents. The sixteen identified variables were then arranged according to the occurrences level as shown in Table 1.

TABLE I
 THE TABULATION RESULTS OF RESEARCH VARIABLES

Order	Variable	Value %
1	New Product Development (NPD)	13.42
2	Product Advantage	12.75
3	Market Orientation	10.74
4	Manag. & Organizational Performance	8.05
5	NPD Speed	8.05
6	Product Innovativeness	7.38
7	Technological Advance	7.38
8	Customer Satisfaction	6.04
9	Product Characteristic	4.70
10	Financial Performance	4.03
11	Product Development costs	4.03
12	Market Environment	4.03
13	Product Quality	3.36
14	Teamwork Advance	3.36
15	Market Share	2.01
16	Price	0.67

In addition to using the tabulation method, the identification of research variables also used the meta-analysis to examine the correlation between independent variables X (those affecting product success) and the dependent variable Y (product success). The value of r (correlation coefficient) statistically indicated the strength of the correlation between independent variables and the dependent variable. Meanwhile, the symbols (+) or (-) indicated the direction of the correlation from which the values ranged from -1.00 to +1.00 [13]. The correlation values generated using the correlation meta-analysis are shown in Table 2.

TABLE 2
AVERAGE CORRELATION VALUES OF EACH VARIABLE
(SORTED ACCORDING TO R VALUE)

Order	Variable	Average r value
1	Product Characteristic	0.58
2	Customer Satisfaction	0.49
3	Manag. & Organizational Performance	0.44
4	Product Advantage	0.40
5	Technological Advance	0.39
6	Price	0.38
7	Market Environment	0.36
8	Market Orientation	0.33
9	New Product Development (NPD)	0.32
10	NPD Speed	0.21
11	Product Development costs	0.14
12	Teamwork Advance	0.14
13	Product Innovativeness	0.11
14	Financial Performance	0
15	Market Share	0
16	Product Quality	-0.15

Table 1 and Table 2 show the results of different orders. This difference is caused by the methods used in the data processing. In the tabulation method, the values are arranged in order according to the occurrences level, while in the correlation meta-analysis, the order is arranged according to the average correlation values (r). In the correlation meta-analysis, the product characteristic is a variable that strongly affects the product success, followed by customer satisfaction, management & organizational performance, and product advantage.

B. Theory-Based Research Model

Based on the results as shown in Tables 1 and 2, and comparing them with previous meta-analysis studies, there are five variables that impact on product success. These five variables are the grouping results of the sixteen variables described in Table 1 and Table 2. The grouping results are shown in Figure 3.

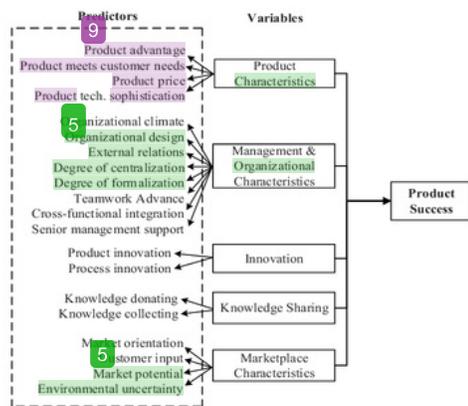


Fig. 3. Grouping results of research variables

The grouping results as shown in Figure 3 were used to construct a theoretical model that describes the correlation between research variables. The design of this

theoretical model was derived from the theories and results of previous research. Such a theoretical model will form new ideas to be tested and researched further [14]. The correlation between five research variables used in the theoretical model is described in Figure 4 and tested using seven research propositions (P_i).

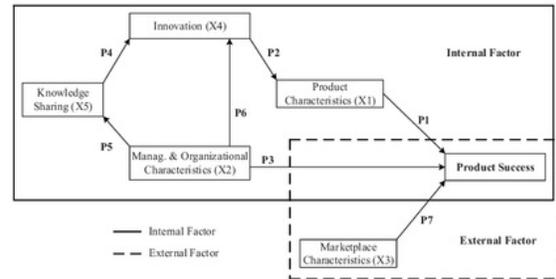


Fig. 4. Theoretical model

C. Research Propositions

A research proposition is a concept or construct that explains certain phenomena, while a model is a collection of propositions or statements that elaborate the correlation between constructs [15]. In the current study, the model consists of seven propositions (P_i) that underline the correlation of five research variables with the product success. The literature that supports the propositions is summarized in Table 3.

TABLE 3
RESEARCH ON THE CORRELATIONS BETWEEN CONSTRUCTS

P	Correlation between Constructs	References
1	The product characteristics are positively related to the product success	[6], [7], [9], [16]–[20]
2	The innovation are positively related to the product characteristics	[21]–[23]
3	The management & organizational characteristics are positively related to the product success	[6], [7], [16], [17], [20]
4	The knowledge sharing are positively related to the innova	[24]–[26]
5	The management & organizational characteristics are positively related to the knowledge shari	[6], [16]–[18], [26]
6	The management & organizational characteristics are positively related to the innovation	[16], [17], [20]
7	The marketplace characteristics are positively related to the product success	[6], [16]–[18], [20]

IV. DISCUSSION

The fundamental problem in research on product success is the definition of “success” because the word success has multiple perceptions or meanings. The notion of success may differ in groups involved in a product development project (R&D, marketing, and production), for instance, whether the definition of “customer acceptance” is an “indicator” or a “determinant” of the product success. There are currently a few theoretical

studies that differentiate the “indicators” and “determinants” of the product success [5]. In addition, the product success is also affected by many aspects. The evaluation of the success of a product development should be measured together with other aspects [3]–[6]. Based on the measure of product success, the current study uses four indicators of success, namely profitability, domestic market share, foreign market share, and sales objectives.

The current literature study explores various meta-analysis studies to find out the variables affecting the product success, especially those conducted by Henard & Szymanski [16], Evanschitzky et al. [17], Cankurtaran et al. [6], and Huang & Tsai [18]. The result of this study is to identify five main variables that impact on product success, i.e. product characteristics, management & organizational characteristics, marketplace characteristics, innovation, and knowledge sharing.

The meta-analysis study by Henard & Szymanski [16] found four variables that impact on product success, i.e. product characteristics, firm process characteristics, marketplace characteristics and firm strategy characteristics. The meta-analysis [17] by Evanschitzky et al. [17] used five variables, i.e. product characteristics, process characteristics, strategy characteristics, organizational characteristics, and marketplace characteristics. The meta-analysis study by Huang & Tsai [18] used five variables, i.e. strategy, process, product effectiveness, organization, and environment. The meta-analysis study by Eisend et al. [20] found relative advantage as a variable affecting new products’ success, while Cankurtaran et al. [6] found new product development speed as a variable that correlated with the product success. If carefully scrutinized, the variables used in previous meta-analysis studies involved similar predictors. For example, the variable of product characteristics used the predictors of product advantage, product price, product meeting customer needs, and product technological sophistication.

The current literature study successfully found other variables that have an indirect impact on the product success, including knowledge sharing and innovation (Figure 4). Previous studies on innovation have shown that innovation activities are a means of increasing profitability and a process of achieving company success since continuous innovation will produce successful products [21]–[23]. Previous studies on knowledge sharing also show no direct impact of knowledge sharing on the product success, but it can improve the innovation capability that affects the product success [24]–[26].

V. CONCLUSION

The current study found five variables that impact on the product success, namely product characteristics, management & organizational characteristics, marketplace characteristics, innovation, and knowledge sharing. Three variables, i.e. product characteristics, management & organizational characteristics, and marketplace characteristics, directly affect the product success, while

the other two variables, i.e. innovation and knowledge sharing, have no direct impact on the product success. These five variables are composed of twenty sub-variables (predictors). The correlation between these variables was tested using seven research propositions.

In future research, the research propositions will be tested to determine whether there is an influence of the independent variables X (those contributing to product success) on the dependent variable Y (product success). This test is done by paying attention to CR (critical ratio) where the higher the CR value, the more significant the research results. The significance limit of the research results is also shown by the value of *significance limit*.

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