

## Relationship of Intangible Resources and Product development Cost In Meat-processing Industry<sup>\*</sup>

Mada Chayathatto (มาร์ฎา ชยทัตโต)<sup>\*\*</sup>

Vichayanon Rattanawiboonsom (วิชยานัน รัตนวิบูลย์สม)<sup>\*\*</sup>

Pupong Pongcharoen (ภูพงษ์ พงษ์เจริญ)<sup>\*\*</sup>

### Abstract

This paper presented new findings on the relationship between resources and product development. It showed that the values of intangible resources were correlated with product development costs at a highly significant level. In fact, previous studies of costs focused on estimating the tangible resource values and encouraging industries to use the intangible resources to develop products. But past research has never shown the relationship level of the intangible resources to product development cost. Accordingly, this research examines the levels of the relationship between the value of intangible resources and the product development cost. The results show that the intangible resource values associated with product development cost have a high level of significance; especially the values of knowledge and collaborative partnership. These results indicate that intangible resources can increase the effectiveness of cost management in the product development process of industries. Based on this finding, industries should focus on the prominence of knowledge and collaborative partnership to increase the value of intangible resources that are beneficial to use and allocate resources accordingly. Therefore, it is strongly suggested further research investigate the optimal amount to invest to add value to the intangible resources that must be passed on to new products and new services in response to the behavior of consumers.

**Keywords:** intangible Resource value, Product Development, Cost

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มหาวิทยาลัยนเรศวร

<sup>\*\*</sup> A doctoral student of Doctor of Philosophy Program in Business Administration , Naresuan University,  
E-Mail: madac@nu.ac.th

นักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิตการบริหารธุรกิจ คณะบริหารธุรกิจ เศรษฐศาสตร์และการสื่อสาร  
มหาวิทยาลัยนเรศวร

## บทคัดย่อ

บทความนี้นำเสนอข้อค้นพบใหม่ที่เกี่ยวข้องกับความสัมพันธ์ระหว่างต้นทุนกับทรัพยากร ในการพัฒนาผลิตภัณฑ์ โดยค้นพบว่า มูลค่าของทรัพยากรที่จับต้องไม่ได้ (Intangible Resource) มีความสัมพันธ์ต่อต้นทุนการพัฒนาผลิตภัณฑ์ในระดับที่สูงอย่างมีนัยสำคัญ และในขณะที่งานวิจัยในอดีตที่เกี่ยวข้องกับการหาต้นทุนกิจกรรมจะให้ความสำคัญกับการกำหนดค่าทรัพยากรตัวหลักต้นทุนในเชิงปริมาณของทรัพยากรที่จับต้องได้ และเสนอแนะให้อุตสาหกรรมใช้ทรัพยากรที่จับต้องไม่ได้ในการพัฒนาผลิตภัณฑ์ แต่ยังไม่มีการศึกษาความสัมพันธ์อย่างเป็นทางการ และประเมินมูลค่าทรัพยากรที่จับต้องไม่ได้ที่ส่งผลต่อต้นทุนการพัฒนาผลิตภัณฑ์อย่างเป็นรูปธรรม ส่งผลให้อุตสาหกรรมไม่ทราบความได้เปรียบหรือเสียเปรียบของต้นทุนการพัฒนาผลิตภัณฑ์ที่แท้จริง ดังนั้นประโยชน์ของงานวิจัยฉบับนี้คือการแสดงให้เห็นถึงระดับความสัมพันธ์ที่สูงของทรัพยากรที่จับต้องไม่ได้กับต้นทุนในการพัฒนาผลิตภัณฑ์ และแสดงให้เห็นว่ามูลค่าของทรัพยากรที่จับต้องไม่ได้ที่เกี่ยวข้องกับต้นทุนการพัฒนาผลิตภัณฑ์นั้นประกอบไปด้วย มูลค่าองค์ความรู้ภายในองค์กร และมูลค่าเครือข่ายความร่วมมือ ซึ่งผลงานวิจัยสะท้อนถึงทรัพยากรที่จับต้องไม่ได้สามารถช่วยเพิ่มขีดความสามารถประสิทธิภาพในการบริหารจัดการต้นทุนของกระบวนการพัฒนาผลิตภัณฑ์ของภาคอุตสาหกรรม และ ภาคอุตสาหกรรมควรให้ความสำคัญต่อการรับรู้มูลค่าและสร้างมูลค่าเพิ่มให้กับทรัพย์สินที่จับต้องไม่ได้ที่เป็นประโยชน์ต่อการใช้และการจัดสรรทรัพยากรภายใต้กิจกรรมในการพัฒนาผลิตภัณฑ์ และจะเกิดประโยชน์อย่างยิ่งกับงานวิจัยในอนาคตที่จะให้ความสำคัญต่อการศึกษาปริมาณการลงทุนเพื่อเพิ่มมูลค่าของทรัพย์สินที่จับต้องไม่ได้ที่เกี่ยวข้องกับกระบวนการพัฒนาผลิตภัณฑ์และบริการใหม่เพื่อตอบสนองพฤติกรรมของผู้บริโภค

**คำสำคัญ :** มูลค่าทรัพยากรที่จับต้องไม่ได้ ต้นทุนการพัฒนาผลิตภัณฑ์

## Background and Rationale

Product development is an innovation that requires both tangible resources and intangible resources (Eda Atilgan-Inan et.al, 2010). In fact, intangible resources refer to intangible costs (L.Cannavacciuolo et.al , 2011), which most industries do not evaluate and record in the company's book-keeping reports. However, intangible resources can bring values to the business, and they are vital for product development in an industry (Branco and Rodrigues, 2006).

Both tangible resources and intangible resources have an impact on the ability to develop products (Eda Atilgan-Inan et.al, 2010; Justyna Spiewak, 2012). In addition, intangible resources are long-term resources that are difficult to counterfeit and replace and an industry can use them to develop capacity (Dong Yang, 2012). A typology of intangible resources that is relevant to product development includes skilled procedures, employee knowledge and employee experience, employee loyalty to the organization, and corporate culture.

In meat processing, intangible resource, typically benefit the company over several accounting periods. Therefore, it is vital to realize the relationship between intangible resources and product development in order to enhance the ability to manage the costs of product development in the meat processing industry.

Accordingly, This research aimed to specify study the relationship between the values of the tangible and the intangible resources which has an impact on the product development cost in meat processing industry

It also attempted to introduce the data models that industries should collect to be used in evaluating intangible resources and selecting the resources that are appropriate to the product development (Wang and Ahmed, 2007). To be exact, it presents 1) introduction, 2) conceptual framework, research framework and hypotheses, 3) research methods, 4) results, and 5) conclusion and discussion.

## **Theoretical background and Conceptual framework**

### **Product development and cost management in meat processing industry**

The ability to develop products that are low cost but still meets the needs of consumers that change is what helps to create a competitive advantage by consolidating and survival of the meat processing industry (Mahalik & Nambiar, 2010). So product development is being taken to use as a tool for management within the industry. The goal is to provide entrepreneurial development to resource management and planning, resource allocation processes for product development goals of managing costs (Hsieh et al., 2008) (Kleinschmidt et al., 2007).

### **Intangible resources for Product Development**

The resources can be divided into two types. The first type includes tangible resources which include any concrete assets that can be valued in the accounts and post tangible costs, for example, equipment, tools or materials used in production (L.Cannavacciuolo et. al 2011). The second type includes intangible resources are difficult to counterfeit and replace, for instance, knowledge, skills, workers' knowledge and experience. (Dong Yang, 2012).

Combining the resources together to execute them within the organization contributes to enhance the competitiveness of the company and to enable the organization to achieve its established objectives (Branco and Rodrigues, 2006) (Hamel & Prahalad, 2006). But In meat processing industry, creating advantages and sustaining competitiveness of the

company are dependent on its ability to improve the intangible resources in order to effectively use them (Henri, 2006).

Types of intangible resources used have an impact on the ability to develop products (Mike Reid a,\*, Erica Brady b,1., 2007) (Justyna Śpiwak, 2012) of previous studies show on table below:

(Resource)	Romer, 1990	Cooper, et al., 1994	Brown & Eisenhardt, 1995	Haenard & Azymski, 2001	Lee, J. H., Lee, J. H., & Lee, J. H., 2007	S.Sarkar & A.I.A Costa, 2008	Dong Yang, 2012	Justyna Spiewak, 2012	J Gómez, P. Vargas, 2012	R.S.Khan, et al., 2013
Collaborative Partnership and Network					X				X	X
Individual Skill and Competency	X	X						X	X	X
Knowledge			X	X	X	X	X	X		

In fact, intangible resources refer to intangible costs which pose intangible costs and of which the costs need to be evaluated (L.Cannavacciuolo et.al 2011). Therefore, the research has collected relevant information for use in evaluate value of intangible as following;

#### Collaborative Partnership (CP)

Collaborative means the cooperation between business partners or customers (R.S.Khan et al., 2013). Evaluation of cooperation network value is part of an assessment of the relation capital. A data model to assess the financial value of collaborative partnership can be collected from the cost of the activities carried out with the cooperation network associated with product development , Specifically, five product development activities are as follows; (1) low cost production, (2) upscale innovation, (3) high quality, (4) improvement in engineering process towards end product, and finally, advance function of the end product. (Eric Fang et al., 2008)

### Individual Skill and Competency (IC)

According to Kanyarat Teeratanachaiyakun (2016), Strategic human resource management would focus mainly on developing employee with competence, commitment and contribution, which could be done by empirical performance, enabled the strategic management in line with the organization goal.

Individual skills and competencies refer to the ability, expertise and experiences to support the product development process (Seyed Ali Akbar Ahmadi et al., 2012) A data model to assess the financial value can be collected from the combination of individual skills and competencies of experts contributing to the success of product development. It includes the effects on developing products to meet the needs of the clients and developing product qualities via consideration of the stakeholders and customers. In fact, the success of product development and monetization of products developed according to expectations of sale values in percentage can be reached via understanding the goals of hiring workers and the implementation of the objectives of employment, the importance of developing products that contribute to the survival of the business, the ability to command and control the use of technology, and the goal of the process or product development based on customer needs and experts (Anna Lipka., et al , 2014) (Marta Corrêa Dalbem et al., 2014).

### Knowledge (KM)

The knowledge organization means an activity that contributes to the knowledge, methods and processes, which will lead to the development of innovative products (S.Sarkar, AIA Costa., 2008) (Dong Yang., 2012) by the estimation of knowledge of the implementation ability in both the financial models and non-financial models. The conditions of the market and cost changing affected the requirements of the knowledge directly (Narisara Intasiri , 2015)

This study uses the approach of knowledge capital value (KCV) to assess the value of knowledge in the organization. Because the method used to estimate the cost of knowledge can not only show the data in the past but also demonstrate the potential knowledge capacity of the company in the future (Daum , 2001) (Živilė Savickaitė , 2014).

A conceptual framework of Relationship between intangible resource and product development cost In meat processing industry as follows

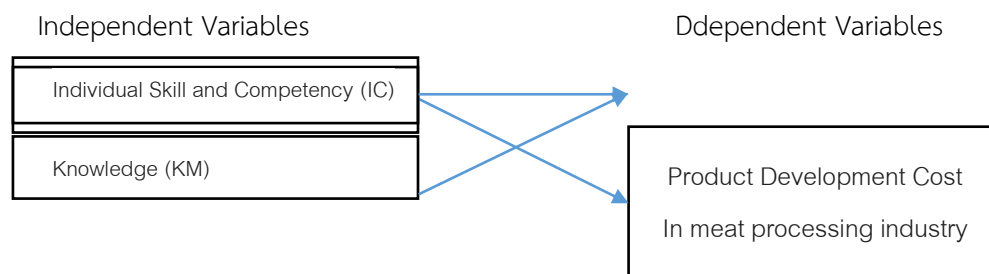


Figure 1. A conceptual framework

## Methodology

### Sample and data collection

This study follows their approach and has used an official database companies engaged in meat processing industry, medium and small, which were product development process inside and were registered with the Department of Plant in the year of 2014. The number of data population is 315 (93 medium-sized and 222 small-sized companies) (Bureau of Industrial Research, 2014).

The subjects were then selected by estimating the proportion of the population at the level of 0.5 and a reliability value of 95 percent, resulting in 93 medium-sized companies and 185 small-sized companies equally 278 companiess (Yamane, 1973). And get response 210 companiess which had product development processes. The response rate was 75.54 per cent.

In order to understand the relationship between intangible resource which has impact an the product development cost. The research instrument was a questionnaire obtain information concerning value of intangibles and product development cost. The questionnaire was composed of quantitative data questions framed by conceptual framework of this research.

Reliability of the measurements was computed by Cronbach alpha coefficients. In the scale of reliability, the coefficient values in this study are greater than 0.70. This can be interpreted as meaning that the scale of all measures is internally consistent

## Data Analysis

Regression analysis is adopted to test relationships between the intangible resources and product development cost. The result of research present on the next section.

## Results

The results of ANOVA show that the significance value is 0.000, which is below 0.05., there is shows the companies that have the different between knowledge value and collaborative partnership value at the different cost of product development. In Table 1 demonstrate that there is a significant relationship between the value of the intangible resources and the product development cost, and this relationship is high

Table 1 MEANS, STANDARD DEVIATIONS, AND CORRELATIONS

Variable	Mean	SD	1	2	3	4
product development cost	18.22	2.62	1.000			
collaborative partnership	12.64	3.09	.634**			
Individual competency	17.59	2.87	.956**	.710**		
knowledge	16.57	2.52	.971**	.688**	.987**	1.000

N = 210 , <sup>\*\*</sup> P < 0.001

Table 1 also shows the correlations of the product development cost is significantly correlated with collaborative partnership ( $r = .634^{**}$ ), Individual competency ( $r = .956^{**}$ ), and knowledge ( $r = .971^{**}$ ). The correlation level is more than 0.5 and highly significant ( $p < 0.001$ )

Table 2 The intangible resources related to product development cost

Model	variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
2		B	Std. Error	Beta		
	(Constant)	1.421	.344		4.130	.000
	collaborative partnership	-.056	.023	-.066	-2.428	.016
	knowledge	1.056	.028	1.016	37.469	.000
	R square = 0.945 , Adjusted R square = 0.944					

<sup>\*\*</sup> p < 0.001 two – tailed test

Table 2 also exhibits that all models were significant, except for model 2 that only included two independent variables. The result presented that collaborative partnership and knowledge are highly significant. The results suggest some implications that should be address in order to better understand the effects of the intangible resource on the product development cost of meat processing industry.

## Discussions

The value of the intangible resources is highly associated with the product development costs, especially the value of knowledge organization and the value of collaborative partnership. The regression model for an explanation of the relationship of Intangible resources and product development cost in meat-processing industry, it was found that the value of knowledge direct and positive influence on the product development cost effectiveness In Meat-processing Industry to most extent. Next level of influence was the value of collaborative partnership value that direct and negative.

Both of these intangible resources are beneficial for product development in terms of time and budget (Hamidreza Esmalifalak et. al, 2015). The value of knowledge organization is crucial for concept development and quality specification of product development in order to unlimitedly propagate manufacturing capability (Keshavan Niranjana, 2016). At the same time, the value of collaborative partnership is an intangible resource which affects product development cost. The ability to invest and resource constraints are related to limited product development of the small meat processing industry (Bhaskaran, et al., 2006; Dües, et al., 2013). Therefore, the establishment of a specialized collaborative network is needed. It reduces the risk of product development failures and manages the cost of product development effectively (Dundusid Porananond, et al., 2014).

There are three benefits gained from this research as follows.

1) The results obviously reflect the cost management in product development. Taking into account, the value of the intangible resources is highly associated with the cost of product development. Thus, to recognize the genuine capital, industries should determine the cost of the capital driven by intangible resources.

2) Businesses should consider data collection and cost evaluation of intangible resources in order to realize their authentic and concrete value and effectively plan the utilization of the capital driven by the intangible resources. This can be the actual advantage of the capital management for product development.



3) The intangible resource will help to develop innovative capabilities and create a competitive advantage in the industry sustainably. On the development of products process should consider organizing intangible resources activities related to activities linking value chain, from design to real manufacturing process (Bhaskaran et al., 2006) (Rui Abrantes \*, José Figueiredo, 2015).

Furthermore, this study found that the value of knowledge organization is highly associated with the cost of product development; as a consequence, further studies should investigate the pattern or model of knowledge organization, which industries should use as it is the resource that generates values to the organizations, and it is related to the competition of product development yet to come.

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