

## **The Development of Innovative Product Concept: A Case of Organic Rice in Thailand**

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### **Abstract**

Due to today competitive business environment and the dynamic of consumer behavior, especially their never-ending wants and demands, the product development is therefore essential for any organizations. In the new product development process, the concept development (product idea, product concept and product image) and testing are important steps prior to making decision on commercialization. This research aims to explore the new ideas in developing the innovative products using new raw material, Organic Rice, as an ingredient. It also investigates the new product concept acceptance and attitude of consumers on the new Organic Rice products in Thailand. This research applied the mixed research methods: qualitative research (literature review and in-depth interviews with 15 certified Organic agricultural manufacturers and processors) and quantitative research (field survey with 213 respondents). The results from qualitative content analysis included the clear details of new product concept development and the relevant target markets for the Organic Rice snack bar and the extracted Organic Rice facial press-powder products. Further, the quantitative research using the questionnaire survey was conducted to test the consumer's new product acceptance and attitudes on both Organic Rice products. Using SPSS program, the results showed the positive product acceptance of Organic Rice snack bar products with sweetened plant ingredients, rather than using sugar, with reasonable price. The respondents indicated positive buying intention if the product is produced and available in the market. Similarly, the extracted Organic Rice facial press-powder product, positive product acceptance was evident on the mild rice scent in the product, with reasonable price. However, the respondents were unsure whether they would buy the product in the future. This research contributes to the application of new product development in Thailand and other countries with similar products in providing insights to related businesses and practitioners in developing and testing new product concepts.

**Keywords:** Innovative Product, Product Development, Product Concept, Organic Rice, Thailand.

**JEL classification:** M31, M39

### **1. Introduction**

The new product development process includes the stages of identifying customer needs, generating concepts, selecting a concept (or a set of concepts), designing a product, testing prototypes of a new product, and launching the new product (Takai, 2009; Ulrich & Eppinger, 2011; Relich & Pawlewski, 2017). For companies to maintain success in competitive markets, they need to be innovative and keep developing new products and ideas (Banerjee & Soberman, 2013; Eisend & Evanschitzky, 2015; Hubert et al., 2017). The simultaneous development of product and production system is a promising approach to enhance the optimized development procedures (Gräßlera, et al. 2017) which include ability to use knowledge, creativity, skills and experience in technology or new product development and management, new manufacturing

processes or new services, in order to meet the market need. From the literature, innovation can be defined as bring a new concept or utilizing the exist ones in a new way in order to appreciate the economic benefits. In addition, innovation is defined as doing something different from others, grasping opportunity in dynamic environment and contribute the new ideas that is beneficial themselves and society (Eumpakdee, 2013). Innovation is consequently important because consumers value innovations highly, and innovative products have the potential to prompt purchases (Bartels & Reinders, 2011).

New Product Development (NPD) is the process of getting any new product or service to market. In NPD, speed-to-market is viewed as a vital weapon which can yield competitive advantage, gain higher profits and market share, and exploit opportunities within the market place (Nelson et al., 2016). Product development process (PDP) is a complex system, in which required activities and resources are connected to each other according to specific rules of the process (Fu, 2013). Due to the competitive and challenging global market, the innovative products requires companies a lot of effort (Schutzer et al., 2017). The creation of an appropriate strategy development, climate, protection of resources and preparing a launch system is a major challenge (Chwastyk & Kolosowski, 2014). Furthermore, companies involve users in the new product development process (Guo et al., 2017). Time, cost and quality are the three focused criteria in product development projects (Kandt et al., 2016). Initially, companies have mainly optimized processes in production and logistics. Now, an improve ment in the Product Development Process (PDP) further takes place (Dombroawski & Karl, 2016). Product development process can be divided into several phases, and each phase can be decomposed into a large number of design activities as well as other elements Fu, et al., 2014). Therefore, PDP can be considered as a large, complicated and unstructured network.

Rice is an important food crop in many parts of the world. It is vital for the nourishment of the population in Asia, as well as in Latin America and Africa (Alikhani et al., 2013). In Thailand, rice is one the most planted crops (11.59 Mha) for domestic consumption as well as worldwide export and is thus of high economic importance for the country (Office of Agricultural, 2014). In 2014, the total paddy rice product of Thailand was 36.8 Mt. Also Thailand was the world's 6th largest rice producer and the largest exporter in the world with an export of 10.3 Mt, accounting approximately a quarter of the total rice export in world market (Bank of Thailand, 2014). About 22% of the rice paddy is grown in northern Thailand due to the region's appropriate climate and geography (Rice Department of Thailand, 2014). The rice variety chiefly planted in the northern region during the wet season is Kao Dok Mali 105 (KDML 105), commonly referred to as fragrant jasmine rice. It is very popular around the world due to its high quality and high aroma scent. Its price in the rice world market is almost double that of other cultivars of rice (Kong-ngern et al., 2011).

It is of significant to Thailand or any main-produced agricultural countries, therefore it is vital to develop new products made from rice in order to maintain its competitiveness in the market. This research aims to explore the new ideas in developing the innovative products using new raw material as an ingredient, Organic Rice and investigates the new product concept acceptance and attitude of consumers on the new Organic Rice products in Thailand.

## **2. Literature review**

### **2.1 Innovative Product**

Product innovation is central for firms in developing and maintaining their competitive advantage (Jan et al., 2017) and increasing competition and accelerating product life cycles, therefore product innovation becomes even more important (Slater et al., 2014). Product innovation process is considered to be one of the key criteria for evaluating sustainable development and competitiveness of firms (Li & Ni, 2016). Typical early studies include in

recent years showed that product innovation affects the degree of product differentiation by reducing product substitutability (Tiwari et al., 2016).

## **2.2 Product Concept**

Designing and evaluating product concept is one of the most important phases in the early stages of the design process as it not only significantly affects the later stages of the design process but also influences the success of the final design solutions (Augustine et al., 2010). Concept selection is one of the most important decisions in product development, since success of the final product depends on the selected concept. The exploration and evaluation of alternatives early in the product development process reduces the amount and magnitude of changes in later stages and increases the likelihood of success of new product development projects (Arbelaez-Estrada & Osorio-Gomez, 2013). Therefore the decision-making activities through all the design process are crucial for the final product success (Yodkhum et al., 2017).

## **2.3 Organic Rice in Thailand**

Organic Rice production system is a system of rice production management that enhances the ecosystem, sustainable biodiversity and biological cycles. It emphasizes the use of natural materials by opposing the use of synthetic raw materials, transgenic plants, animals or microorganisms or raw materials derived from genetic modification. It also covers the product management, which carefully emphasizes on every processing step to maintain the organic integrity and quality of organic rice products (Sullivan, 2003). Thai Rice has been massively exported worldwide however the markets are becoming more competitive than the green market that ever has been promoted. In order to maintain the same level or enhance of competitiveness, Thai Rice needs to be considered for environmentally conscious products to meet the international environmental standards (Yodkhum et al., 2017).

## **3. Methodology**

There were two stages of this research; namely, exploratory qualitative research (literature review and in-depth interviews) and quantitative research.

The first stage included documentary research from secondary archival data of public and government data sources as well as electronic sources. In addition, in-depth interviews of semi-structure questions on Organic Rice production, new product concept development and the tendency of current market demand were conducted with 15 certified Organic Rice farmers and agricultural manufacturers and processors in Thawat Buri District, Pathumrat District, and Kaset Wisai District of Roi-Et Province, Muang District, and Chiang Yuen District of Maha Sarakham Province, Mueang District and Ban Had District of Khon Kaen Province, and Muang District, Kamala District, and Khao Wong District of Kalasin Province where most certified Organic Rice is planted and produced from April to June 2016. The content analysis was applied in qualitative research in order to identify additional important factors that related to relevant factors in product testing and product acceptance, and then to design the questionnaire in the next stage, quantitative research.

The second stage, quantitative research using the field questionnaire survey, was conducted to test the consumer's new product acceptance and attitudes on both Organic Rice products from September to November 2016.

The non-probability sampling was proceeded using purposive, quota and convenience sampling methods included selecting the market locations (Bangkok, Roi-Et, Khon Kaen, Mahasarakham and Kalasin) with 400 respondents and selection criteria included Thai nationality and experience on Organic Rice products. This means the respondents were asked whether they are Thai and had consumed (tried/bought) prior to taking the questionnaire in the

last 6 months. In total, 213 Organic Rice consumers completely responded to the questionnaires, therefore, the response rate was 53%. Each respondent was required to answer two sets of questionnaires: new product concept testing and product acceptance testing. The total of 426 usable questionnaires was collected and divided into two data sets: 213 questionnaires on new product concept testing and product acceptance testing from Thai consumers in four different provinces where the potential markets are; namely, Bangkok, Roi-Et, Khon Kaen, Mahasarakam and Kalasin, then analyzed using SPSS program such as percentage, mean, standard deviation and coefficient of sample correlation.

<b>Respondent's Profile</b>	<b>Frequency (person)</b>	<b>Percentage</b>
Do you consume any Organic Rice?		
Yes	213	100.0
No	0	0
Total	213	100.0
Have you consumed any Organic Rice products in the last 6 months?		
Yes	213	100.0
No	0	0
Total	213	100.0
Your residential province		
Bangkok	105	49.3
Roi-Et	27	12.7
Khon Kaen	27	12.7
Mahasarakam	27	12.7
Kalasin	27	12.7
Total	213	100.0
Gender		
Female	157	73.7
Male	56	26.3
Total	213	100.0
Age		
18-30 years old	92	43.2
31-50 years old	88	41.3
Above 51years old	33	15.5
Total	213	100.0
Marital Status		
Single	119	55.9
Married	83	39.0
Divorce/Widow	11	5.2
Total	213	100.0
Education Level		
Vocational level or equivalent	123	57.7
Primary school/Secondary school/High school or equivalent	48	22.5
Bachelor degree		
Higher than Bachelor degree	18	8.5
Total	24	11.3
	213	100.0
Occupation		
Private company officer	102	47.9
Entrepreneur/Business owner	38	17.8
Government officer	29	13.6
Freelance/Part-time job	22	9.9

Student	10	4.7
Stay home parent	8	3.8
Farmer	5	2.3
Total	213	100.0
Income (Baht per month)		
10,001-30,000	142	66.7
Less than 10,000	46	21.6
30,001-50,000	16	7.5
More than 50,000	9	4.2
Total	213	100.0

**Table 1 Quantitative Data Collection - Respondent's Profile**

## 4. Findings

### 4.1 The Qualitative content analysis

At present, consumers can be divided into three different markets; namely, domestic, Asian, and European markets. Domestic and Asian markets are considered similar due to today consumers' busy lives and their consumption behaviors need more convenient products. On another hand, European market seems more fragmented based on different lifestyles.

The results from the qualitative content analysis find that the new product concept development and testing should be clear in details that is relevant and suits specific target markets for the Organic Rice snack bar and the extracted Organic Rice facial press-powder products. As mentioned, distinctive consumer wants come from domestic and overseas markets such as Asia and Europe. It is found that Snack Rice Organic products should be developed for domestic market and Asian market, while Organic Rice facial press-poder products should be developed for European market. In addition to specific target markets for these two new product concepts, the Organic Rice ingredients can also be used as the core and supplementary ingredients for those products. These new products' attributes are as follow: The Organic Rice snack bar is the processed Organic Rice in the square shape that is easy to eat (convenient) and therefore suitable for snacks or main meals. It has various nutrients and free of chemicals. It also has Beta-Carotene, Calcium and Vitamin E which are considered good for everyone's health. On another hand, the extracted Organic Rice facial press-powder products consist of extracted Organic Rice. It has two color tones: white and beige. It has Beta-Carotene and Gamma-Oryzanol which help restoring skin cell, preventing aging, and protecting skin from UV, Oryza-Ceramide helps smoothening skin, Vitamin-A helps reducing acne, and Niacin helps restoring skin.

### 4.2 The Quantitative Analysis

The majority of respondents indicates the need to understand these new products prior to making any buying decisions due to its innovative product nature (new to the market). Therefore their major buying criterion is buying experience on healthy products.

For the Organic Rice snack bar, the majority of respondents agree that it is suitable for working people who prefer convenience in mix-grain products. On another hand, for the Organic Rice pressed-power, the majority of respondents indicates the importance of mind rice scent of the product with the average price of 174.38 Baht. However, they are unsure whether they will buy the products if the products are available in the market. The results summary is demonstrated in Table 2.

<b>Innovative Product Concept</b>	<b>The Organic Rice snack bar</b>	<b>The extracted Organic Rice facial press-powder</b>
Product	The product is suitable for working people who seek convenience and mix-grain products.	The product consists of mind rice scent.
Packaging	1 Piece 1 Box (12 pieces)	1 Box per product
Price ( $\bar{x}$ )	10 Bath per piece (49.5%), $\bar{x} = 12.27$ Baht 100 Bath = 48.2% per box (12 pieces), $\bar{x} = 113.38$ Baht	200 Bath (22.1%), $\bar{x} = 174.38$ Baht
Consumer Buying Intention	May be (46.9% (	Unsure (36.2% (

**Table 2 Result Summary of Innovation Product Concept Acceptance – Organic Rice**

The product testing results suggests that the product attributes and ingredients of the Organic Rice snack bars should be consisted of healthy nutrients such as vital Vitamins that are important for everyone's health. The majority of respondents likes the overall product image, especially color and scent. On another hand, Organic Rice pressed-powder must consist of Oryza-Ceramide and Extracted Organic Rice with Walnut shell or Talc that help smoothening skin. Both Formulas A and B pressed-powder products receive moderate score on overall image, however, they receive different score on delicacy, that is, Formula A pressed-powder receives high score on delicacy and Formula B receives moderate score on delicacy.

The most suitable marketing communication channel for both innovative products is tradeshow or exhibition. However, the packaging of snack bar needs improvement as it is similar to children product, which is repulsive and unattractive.

Although the product concept acceptant seems positive, the results of buying intention are mostly negative. Most respondents indicate they probably buy the product, however, they comment that the Organic Rice snack bar product is not delicious, the product texture is unappealing like eating foam, therefore it should not be produced. On another hand, the strong scent of the pressed-power seems to be the problem of the Organic Rice pressed-power product as well. The result summary of product testing is demonstrated in Table 3.

<b>Attitude and Buying Intension</b>	<b>The Organic Rice snack bar and</b>	<b>The extracted Organic Rice facial press-powder</b>	
		<b>Formula A-White</b>	<b>Formula B-Beige</b>
Marketing Communication	Tradeshow or exhibition ( $\bar{x} = 4.30$ (	Tradeshow or exhibition ( $\bar{x} = 4.20$ (	
Decision Making (what make them buy)	Nutritient for health ) $\bar{x} = 4.16$ (	It has Beta-Carotene and Gamma-Oryzanol which help to restore skin cell, prevent aging, and protect skin from UV, Oryza-Ceramide helps smoothen skin, Vitamin-A helps reducing acne, and Niacin helps restoring skin. It also has walnut shell or Talc that used for baby powder. ) $\bar{x} = 3.92$ (	
Packaging	High ( $\bar{x} = 3.69$ )	Moderate ( $\bar{x} = 3.49$ (	
Quality	High (color, $\bar{x} = 3.69$ (	High (delicacy, $\bar{x} = 3.59$ )	Moderate (delicacy, $\bar{x} = 3.48$ )
Overall Image	Moderate ( $\bar{x} = 3.27$ (	Moderate ( $\bar{x} = 3.43$ (	Moderate ( $\bar{x} = 3.38$ (
Buying intention	May be (48.8%)	Unsure )46.0% (	

**Table 3 Result Summary of Product Testing (Attitude and Buying Intention)**

**Note: Mean  $\bar{x}$  score is out of 5.**

## 5. Discussions

Although Organic Rice is not relatively new to the market as Suwongchang (2010) has developed the Cereal breakfast from Organic Rice which is similar to Organic Rice snack bar, these new innovative products are still considered new to other markets such as other parts of Thailand and other countries.

In product testing, respondents indicate their experience in buying and consuming Organic Rice products for healthy reason which is consistent with Harper and Makatouni (2002). They study the attitude and consumer behavior toward Organic food in England and find that food safety and benefit are the most important criteria in making decision on Organic Rice products. However, those respondents who are uncertain to accept the products in the future indicate their unfamiliarity with less knowledge about the product value in the new product acceptance testing. On another hand, hard to find products, unsure whether it is really made from Organic Rice, waste of money and unnecessary are reasons not to buy the new Organic Rice products from those who indicate negatively to adopt the new products. This is also consistent with Radman (2005) that most consumers are unfamiliar with and have less knowledge about Organic Rice products. Therefore, they think the products were expensive and the packaging is unattractive. In addition, although Organic Rice consumers in Bangkok agree to the benefits of Organic Rice toward environment and health, they are still confused about the products (Roitner-Schobesberger et al., 2006). It is obvious that product knowledge is important in introducing the new products to consumers in order to educate them and encourage them to try and adopt the new products. This study finds that the new Organic Rice snack bars receive higher rate of product acceptance than the Organic Rice pressed-power products.

## 6. Conclusion, Limitation and Further Studies

This research aims to provide some insights on the new product concept development and product acceptance testing using the new ingredient, Organic Rice, from Thailand. Although this research may not contribute much on theoretical literature, it has substantial contribution in valuable insights in practical implication, especially for those developing countries that mainly focused on agricultural businesses. Further research and development on other local Rice types should be encouraged in order to provide variety choice of products to consumers. Further studies on research and development of Organic Rice snack bar products on their packaging should be implemented in order to attract the specific target consumers who live their busy lives. On another hand, the Organic Rice pressed-powder products should emphasize on their distinctive benefits in order to compete with other products in the current market.

The limitation of this research includes it cannot be generalized due to its specific nature of new products and study setting (some provinces in Thailand). Further studies include continuous innovation of product development, product testing and market testing. Further studies on consumer behavior and value co-creation should be emphasized in terms of theoretical contribution as they are important in order to further develop the new products for specific niche market targets with support from various actors in this specific business.

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