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A Causal Relationship Model of Factors Influencing One Tambon One Product (OTOP) Snack Food Product Quality in Thailand*

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Abstract

In 2021 One Tambon One Product (OTOP) food products reached $3,447 billion domestically and $200 million internationally. Mirroring Japan's highly successful OVOP (One Village One Product) poverty reduction and rural employment program, Thailand's OTOP program has since become a global model of success as well. From May through June 2022, OTOP snack food vendor entrepreneurs were contacted and asked to contribute their opinions about what factors affected their enterprise's food product quality. Using systematic random sampling across six Thai regions, 311 export entrepreneurs, production managers, and marketing managers participated. The results revealed that *product innovation* (PDTI), *process innovation* (PCSI), *packaging design* (PKD), and the *4P marketing mix* (4PMM) all positively influenced OTOP snack food product quality (PDQ), which, when combined, had a total effect R^2 value of 27%. Also, the latent variable TE values for PDTI, PKD, 4PMM, and PCSI, were 0.38, 0.29, 0.22 and 0.11, respectively. Seven of the nine hypotheses examined were supported, with *packaging design* (PKD) determined to have the greatest influence on the *4P marketing mix* (4PMM).

Keywords: Marketing Mix, Process Innovation, Product Innovation, Product Quality, Thailand

JEL Classification Code: C12, C38, E26, J24, L26, L66, O31

1. Introduction

In 1979 the governor of Japan's poorest prefecture (Oita) initiated a poverty reduction program named One Village One Product (OVOP) or 'Isson Ippin Undo' in Japan. OVOP was intended as a 'grassroots' initiative to help Oita's poor lower their dependence on government subsidies while also stemming the worsening crisis of the loss of youth to the big cities and improving each individual's quality of life (Noble, 2019; Prayukvong, 2007; Sitabutr & Paitoon, 2007; Thu, 2013). Under the motto of "*Think globally, act locally*," Governor Hiramatsu inspired countless others globally to lift themselves out of poverty through entrepreneurial endeavors and locally made products.

Some years later, Thailand was trying to exit the economic ravages of the 1997 Asian Economic Crisis and find ways to strengthen its rural poor and small-to-medium enterprises (SMEs) (Frank, 2004; Moha-Asri, 2002; Sitabutr & Paitoon, 2007). Seeing the success of Japan's OVOP program, Thailand initiated a similar program in 2001 for its 7,000 plus tambons (sub-districts) which was labeled '*One Tambon One Product* (OTOP) (Hörstemeier, 2013; Kurokawa, 2009).

The critical strategy then became for the Thai government to develop community-based enterprises (CBEs) through a top-down managed program that promoted home-grown agricultural and handicraft products into larger, export-focused SMEs. (Foreign Office, Office of the Prime Minister,

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2016; Thu, 2013). The development and the sustainability of the rural regions and citizens have been codified in both Thai government and Royal programs, such as the Eighth National Economic and Social Development Plan (1997–2001), which included Thailand's King Rama IX's "Theory of Economic Self-Sufficiency" (Prayukvong, 2007; von Feigenblatt et al., 2021).

Although OTOP had meager beginnings reaching only $7 million in 2001, it quickly grew to a $2.24 billion export powerhouse by 2008 (Changsorn, 2015; Natsuda et al., 2011). Since then, the Thai OTOP has been instrumental in helping many Thais increase their incomes, find new job opportunities, and motivate many to find productive and long-lasting employment, especially in rural and impoverished remote areas (Muslim et al., 2020). Noting the success of the Japanese OVOP programs, the Thai OTOP programs, and the Philippine's One Town One Product (OTOP) programs, the United Nations Industrial Development Organization (UNIDO) has also initiated similar programs in Africa starting in 2008 to help rural development and poverty reduction (Haraguchi, 2008).

Today, Thailand's OTOP program has grown past 70,000 entrepreneurs, with the Thai government heavily supporting current and new initiatives, supply chain development, entrepreneurial workshops, consulting networking, and the development of new OTOP product markets. The central idea behind OTOP today is to have each tambon (sub-district) focus on the development, production, and sales/export of a single product that is best suited for each tambon's location and local skills and wisdom (Changsorn, 2015).

Towards these goals, the Thai Interior Ministry's Community Development Department has reported that 10,000 SMEs have been granted 'five stars,' enabling them to export their products to foreign markets. In 2015, 5,687 exporters took advantage of their five-star ranking and exported over $2.88 billion in products (Changsorn, 2015).

For this study, recent domestic and foreign OTOP sales data were analyzed from the Thai Community Development Information Center (CDIC) website, which can be found online at http://logi.cdd.go.th/cddcenter/. According to the 2021 Excel data, total OTOP sales, both domestic and foreign, were 264,151,464,588.11 THB and 276,561,915,000.11 THB, respectively. In US dollar terms, this was approximately $7,215 billion and $7,553 billion, respectively (CDIC, 2022). When viewed by food group only, these numbers changed to 126,367,652,524.09 THB for domestic OTOP sales and 7,338,776,757.00 THB for foreign OTOP sales in 2021. In US dollar terms, this was approximately $3,447 billion and $200 million, respectively.

Furthermore, a study from Frost & Sullivan (2019, p. 23) discusses the Thai domestic snack food industry. In it, a chart details the Thai domestic retail sales of biscuits, wafers, and extruded and stick crackers, which in 2021 was reported at 29,992 billion THB or nearly $820 million. This is expected to rise to 32,009 billion THB in 2022 ($875 million), and 34,086 billion THB ($932 million) in 2023 Interestingly, the report contributes some of this growth to Thai smaller households, which drives the demand for smaller packages and less quantity. There is also the convenience factor and the need for less time to clean up after consumption. Finally, the above numbers do not include sales for cuttlefish snacks (2,046 billion THB), seafood snacks (5,904 billion THB), meat snacks (16,500 billion THB), and other snacks such as health food bars.

Thus, the incentive for CBEs and local entrepreneurs to become OTOP SMEs and ride the wave of OTOP branding marketed by the Thai government domestically and in foreign markets is very high. This is consistent with Tock and Baharun (2013), who stated that the OTOP brand now personifies perceived value, with the brand opening up many doors to foreign markets.

The Thai OTOP product project encourages communities and villages to develop the quality of their local products by selecting outstanding products from each sub-district which are then evaluated using 1–5 stars. OTOP products consist of a wide range of local products developed from local community wisdom that distinctively reflects the local culture. This is perceived as a strong selling point with high export potential under the Thai government's push using various investment promotion measures until each community can build a reputation with products known to foreigners and in demand in the international market.

Today, approximately 40% of the Thai OTOP CBEs and SMEs are engaged in food processing and handicraft production, which is heavily concentrated in Thailand's northern and northeastern provinces. Also, Thailand is the world's number one exporter of rice flour snacks such as biscuits to countries such as Germany and Sweden, as foreign consumers are increasingly interested in products made from natural raw materials.

Therefore, based on the national importance of OTOP product production, the authors saw the need to examine how product and process innovation influence snack product quality. The investigation also explores how packing design, the production process, and the 4P marketing mix are involved and can be improved to boost international sales and foreigner appeal.

2. Literature Review

2.1. Product Innovation (PDTI)

Cooper and Edgett (2010) have stated that many organizations lack clear PDTI and technology strategies,

which is critical and strongly linked to positive performance in PDTI. This is consistent with Yin et al. (2020), who also saw that sustainable PDTI was enabled by new generations of ICT (information communication technology) and intelligent technologies, which were identified as sustainable and smart products (SSP). Moreover, PDTI is knowledge-intensive and requires collaboration between multiple stakeholders (Ketonen-Oksi & Valkokari, 2019).

Cooper and Edgett (2010) studied innovation development strategies and determined that there are five PDTI indicators. These include 1) improving existing products and launching them into the market as new products, 2) developing new forms of products, 3) creating a production system that operates at maximum efficiency and low cost, 4) innovative products, and 5) able to meet the needs of customers.

In an examination of innovation practices within the electronics sector, Sánchez et al. (2011) also saw the need for 1) creative products, 2) the developing new forms of products, and 3) the creation of production systems for maximum efficiency and low cost. Also, in Thailand, Suwannapusit and Chayomchai (2018) determined that PDTI and PCSI had significant and positive effects on OTOP enterprise financial performance. Anuntarumporn and Sornsaruht (2022) also determined that PDTI had a significant influence on competitive advantage, with innovative capability determined by how well resources get used. Therefore, this results in a continuing demand for innovation, expertise, and entrepreneurial management abilities development.

Therefore, the authors propose the following three hypotheses:

H1: *Product Innovation (PDTI) directly influences Process Innovation (PCSI).*

H2: *Product Innovation (PDTI) directly influences Packaging Design (PKD).*

H3: *Product Innovation (PDTI) directly influences Product Quality (PDQ).*

2.2. Process Innovation (PCSI)

Once again, Khan et al. (2021) have pointed out the importance of being 'green' in their study on process innovation, in which the authors' content concerns energy consumption and environmental pollution and whether sustainable development goals drive green process innovation. Likewise, Awan et al. (2021) explored how to develop green products through PCSI and determined after they studied 239 manufacturing firms that consumer-driven knowledge activities had a greater positive impact on green PDTI than green PCSI.

In Iran, Najafi-Tavani et al. (2018) examined 258 Iranian technology manufacturing firms. They warned their study's readers that caution needed to be taken when collaborative innovation networks were being developed for PDTI or PCSI purposes as they were only significant in the presence of managerial absorptive capacity. Moreover, in PCSI capability, collaboration with research organizations and suppliers was determined to be the most critical factor.

Hullova et al. (2019) begin their discussion by comparing the 50-year-old discussion between PDTI and PCSI and their ability to increase competitive advantage. It is also suggested that even though the literature seems to favor PDTI in its discussions, PCSI is of equal importance in innovation capability with simultaneous consideration of both yielding significant benefits. Therefore, the authors propose the following three hypotheses:

H4: *Process Innovation (PCSI) directly influences Packaging Design (PKD).*

H5: *Process Innovation (PCSI) directly influences the 4P Marketing Mix Strategy (4PMM).*

H6: *Process Innovation (PCSI) directly influences Product Quality (PDQ).*

2.3. Packaging Design (PKD)

Bucci and Forcellini (2007) have written that for many consumer products, the packaging is as important as the product itself and that product development is not finished until the packaging is finished. Chen (2014) has added that a product's packaging design is one of the most critical tools in the consumer marketing communications mix in making consumers happy.

Also, Olander-Roese and Nilsson's (2009) discussion on packaging design suggested that the critical element is to minimize the number of parts. The authors also suggest that PKD must be safe, easy to handle and transport, easy to distribute and store, and designed for ease of use. Furthermore, focusing on production is more important than sales and subsequent profits.

Additionally, other consumer research has suggested that consumers are becoming more receptive to sustainable packaging and its implications for a better environment (Steenis et al., 2018). This is consistent with Wandosell et al. (2021), who also reported a growing awareness concerning 'green packaging' among companies and consumers as a sustainable development method. Wikström et al. (2019) also suggested that PKD should be involved in saving food and preventing food waste. In another study about PKD and how it affects online consumer buying, the authors suggested that packaging graphics, the colors, the label information, and the country of origin were vital elements (Al-Samarraie et al., 2019).

Finally, Ririn et al. (2019) reported how PKD, product quality, and promotion influenced consumer buying

intention. Therefore, the authors conceptualized the following two hypotheses:

H7: *Packaging Design (PKD) directly influences the 4P Marketing Mix Strategy (4PMM).*

H8: *Packaging Design (PKD) directly influences Product Quality (PDQ).*

2.4. 4P Marketing Mix Strategy (4PMM)

McCarthy, in 1960 first identified the original 'marketing mix' 4Ps as *product, price, place*, and *promotion* (Lahtinen et al., 2020), although the actual term had been discussed as early as 1946 by Borden (Anderson & Taylor, 1995). Kotler and Armstrong (2010) later confirmed these aspects as essential tactical marketing tools organizations need to implement their marketing strategies. In a practical way, AirAsia, in its pre-COVID pandemic climb as an aviation leader, increased its market share by improving its level of customer service and its product quality (Yashodha, 2012). As keeping existing customers is less expensive than finding new ones, relationship marketing activities are critical in keeping existing customers (Pearce & Robinson, 2009).

Saif (2015) confirmed these points by reporting that using a marketing mix strategy, the product must be different from the competition, the pricing must be reasonable, the product is adequately promoted, and the strategies must be innovative. However, in an extensive review of the marketing mix literature, Birnik and Bowman (2007) determined that pricing was the least standardized element in the marketing mix. In Oman, Al Badi (2018) also found that all four MM elements for the country's SMEs were essential and significantly impacted achieving competitive advantage, with price being the most critical aspect. Therefore, the authors propose the following hypothesis:

H9: *4P Marketing Mix Strategy (4PMM) directly influences Product Quality (PDQ).*

2.5. Product Quality (PDQ)

Cappelli and Cini (2021) examined wheat flour, pasta, bread, and bakery product production chains and determined an imperative need for sustainable technological innovations and improvements from the cradle to the grave. Specifically, the authors identified the wheat milling process as critical in its influence on flour quality and bread characteristics and detailed how technology improvements were necessary through every step of the production process.

In Indonesia, Wantara and Tambrin (2019) discussed the local making of Madura batik and how competitive it had become. They concluded that both the price and the PDQ were significant contributors to customer satisfaction, but interestingly PDQ had no effect on customer loyalty. In another Indonesian study concerning popular cake products, the authors determined that PDQ and price were necessary for a purchase decision (Hatta et al., 2018).

Finally, when Fischer (2010) examined European Union food PDQ and export performance, they determined that the product's destination was more important than when it was shipped on PDQ.

2.6. Research Objective

To develop a causal relationship model of variables affecting the quality of One Tambon One Product (OTOP) snack products in Thailand.

3. Methods and Materials

3.1. Population and Sample

To assure statistical sampling validity from the 902 potential OTOP snack producers identified across Thailand, the authors collected questionnaires from six Thai regions, including the central region and the Bangkok metropolitan area, the northeast (Issan), eastern, western, northern, and southern regions (Table 1). Systematic random sampling was undertaken according to the proportion from the list of OTOP export producers in the one snack product category. The final number of questionnaires collected from these six regions were 87, 64, 42, 33, 46, and 39 (311 total or 74.12% of the targeted 420 samples) (Table 1).

Statistical support for collecting 311 questionnaires comes from many studies and theories, such as Osborne and Costello (2004), who suggested that collecting 10–20 questionnaires for each observable variable is sufficient for CFA studies. Other researchers have stated that for CFA/SEM studies, a sample size of 200 or more is adequate, depending on the complexity of the model (Hair et al., 2021; Schumacker & Lomax, 2016). After all the questionnaires were collected and reviewed, 311 were judged to be complete enough for use in the study's analysis (Alguacil et al., 2021).

3.2. Questionnaire Design

The instrument used to collect entrepreneur opinion information was an opinion questionnaire about innovation management that influences the export performance of

Table 1: Population and Sample Collection Process

Region	Population	Sample Group		
		Target	Collected	%
Central and Bangkok	254	118	87	73.56
Northeast	184	86	64	74.70
Eastern region	121	56	42	74.55
Western region	95	44	33	74.60
Northern	135	63	46	73.18
Southern	113	53	39	74.12
Combined	902	420	311	74.12

One Tambon One Product (OTOP) in Thailand (Sitabutr & Pimdee, 2017), consisting of six parts as follows.

Part 1 was concerned with each entrepreneur's personal and business information, including items on gender, age, level of education, job title, business model, business longevity, number of employees, and types of snacks produced.

Part 2 was concerned with four opinion items about *product innovation* (PDTI), in which a 5-level opinion scale was used to determine each entrepreneur's consensus with *new style* (x1), *improved products* (x2), *production system efficiency* (x3), and *demand response* (x4) (Suwannapusit & Chayomchai, 2018). The reliability of the items prior to the survey was determined to be 0.92, which is substantial (Taber, 2018).

Moreover, these items expanded on each individual's response to statements concerning the development of new product innovations (x1), such as developing a model according to market demand and reviewing and adjusting investment plans and the cost of developing new products. Product improvement (x2) was concerned with improving existing products in a new manufacturing sector and launching products into markets. Developing the efficiency of production systems (x3) was concerned with creating an efficient production system that results in low manufacturing costs and meets customer needs with fast service (x4).

Part 3 was concerned with five opinion items about *process innovation* (PCSI)**,** in which a 5-level opinion scale was used to determine each entrepreneur's consensus about *process continuity* (such as continuous improvement in production or services and adjusting the management system to be effective and reducing the production process) (y1), *service* (such as after-sales service and develop communication channels with customers) (y2), *modern technology* (such as the use of modern technology in the production process and factory management process and distribution) (y3), *system evaluation and analysis* (such as continuous system evaluation and system analysis) (y4), and *competitive advantage* (such as creating advantages and enhancing competitiveness) (y5) (Suwannapusit & Chayomchai, 2018). The reliability of the items prior to the survey was determined to be 0.95, which is substantial (Taber, 2018).

Part 4 was concerned with four opinion items about *packaging design* (PKD)**,** in which a 5-level opinion scale was used to determine each entrepreneur's consensus about *fewer parts* (such as choosing the suitable material and reducing the number of parts) (y6), *security* (such as designing the packaging with an emphasis on the safety of consumers and the product) (y7), *transportation management* (such as choosing packaging to prevent damage) (y8), and *convenience* (such as design for convenience and ease of use) (y9). The reliability of the items prior to the survey was determined to be 0.92, which is substantial (Taber, 2018).

Part 5 was concerned with four opinion items about *the 4P marketing mix strategy* (4PMM), in which a 5-level opinion scale was used to determine each entrepreneur's consensus about *product* (such as product development to meet customer needs and continuous development) (y10), *price* (such as setting the right price that is fair to consumers) (y11), *location* (promotion locations through intermediaries, distributors, sales agents, and online systems) (y12), and *marketing promotion* (such as having multiple distribution channels and have a promotional strategy that meets the needs) (y13) (Al Badi, 2018; Lahtinen et al., 2020). The reliability of the items prior to the survey was determined to be 0.93, which is substantial (Taber, 2018).

Part 6 was concerned with four opinion items about *product quality* (PDQ) in which a 5-level opinion scale was used to determine each entrepreneur's consensus about *ready to offer for sale* (i.e., such as availability of products for sale and having a system to maintain quality products that

are ready for consumption) (y14), *efficiency* (i.e., product development is efficient with cost-effective products and able to respond promptly) (y15), *reliability and confidence in the product* (i.e., building trust and confidence in the product through reliability and confidence in the product) (y16), and *after-sales service* (such as the service of skilled staff and focus on after-sales service efficiency) (y17). The reliability of the items prior to the survey was determined to be 0.94, which is substantial (Taber, 2018).

As stated, the questionnaire used a 5-level scale which used '5' to indicate the 'most agreement' (4.51–5.00), '4' to indicate 'strong agreement' (3.51–4.50), 3' to indicate 'moderate agreement' (2.51–3.50), '2' to indicate 'little agreement' (1.51–2.50), and '1' to indicate 'no agreement' (1.00–1.50). Finally, the range of Cronbach alpha values was 0.92 to 0.95 (Table 2), which is substantial (Pimentel, 2010; Taber, 2018).

3.3. Data Collection

The data was collected by the researchers using an online Google Forms questionnaire. OTOP participants included export entrepreneurs, production managers, or marketing managers from six Thai regions in 2022. The list of names was obtained from the OTOP category of exported snack products. Systematic random sampling used every second name, from which researchers and their student assistants made coordinating phone calls, after which a link to a Google Form questionnaire was sent via e-mail or Line social media. The first data collection phase was in May 2022, which only achieved a 29.56% response rate. This was followed up with a more vigorous collection effort again in June 2022, from which 311 completed questionnaires were finally obtained.

3.4. Data Analysis

Data analysis used the LISREL 9.1 software program to determine the validity of the causal model and the variable interrelationships and how they affected OTOP snack food quality. Before the SEM analysis, a goodness-of-fit assessment and confirmatory factor analysis were also undertaken.

4. Results

4.1. Goodness-Of-Fit (GOF) Assessment

According to Jöreskog et al. (2016), CFAs should be done to assess a model's construct validity (CV). Additionally, Westen and Rosenthol (2003) suggest that strong construct validity is indicated by high discriminate and convergent validity values. Also, LISREL 9.1 outputs values for χ^2 and χ^2/df (relative Chi-square), which should have validity values $p \geq 0.05$ and ≤ 2.00 (Hooper et al., 2008). Other LISEL 9,1 suggested values for the goodness of fit index (GFI) ≥ 0.90, the comparative fit index (CFI) ≥ 0.95, and the root mean square error of approximation (RMSEA) ≤ 0.05. Also, Schumacker and Lomax (2016) suggest that values for the normed fit index (NFI), the adjusted goodness-of-fit index (AGFI), root mean square residual (RMR), and standardized root mean square residual (SRMR) should be ≥ 0.90, ≥ 0.90, ≤ 0.05, and ≤ 0.05, respectively. From these established indices and their criteria, the study established that the GoF analysis significantly exceeded all established requirements as $\chi^2 = 0.52$, χ^2/df = 0.99, RMSEA = 0.00, GFI = 0.93, AGFI = 0.90, RMR = 0.05, SRMR = 0.05, NFI = 0.94, and finally, the CFI = 0.99. Finally, Cronbach Alpha values (0.92–0.95) also exceeded the commonly accepted value ≥ 0.70 (Tavakol & Dennick, 2011).

4.2. CFA Assessment Results

Table 2 shows the results from CFA reliability and validity results, and the Cronbach α values (0.92–0.95) (Tavakol & Dennick, 2011), the average variance extracted (AVE) values (0.40–0.62), and the construct reliabilities (CR) (0.76–0.86). Hair et al. (2021) have indicated that construct validity (CV) determination should use the AVE, main loading correlations, and the CR. Finally, although acceptable R^2 values are difficult to pinpoint in the literature, Henseler et al. (2015) have proposed that R^2 values of 0.25 are weak, 0.50 are moderate, and 0.75 are substantial.

4.3. Latent Variable Correlation Coefficients (*r*)

Table 3 displays the *r* testing, mean, SD, Skewness, and Kurtosis results.

4.4. Mediation Effects

Table 4 shows that all the model's causal variables positively affected OTOP snack food product quality (PDQ), with a combined R^2 value = 27%. Additionally, the total effect (TE) ranking of the latent variable values determined that PDTI was strongest, followed by PKD, then 4PMM, and finally PCSI, with TE values of 0.38, 0.29, 0.22 and 0.11, respectively.

4.5. Testing of the Hypotheses

Results from the hypotheses testing revealed that seven of the nine hypotheses were consistent with the data and supported (Figure 1).

Table 2: The Results of the Component Analysis of Endogenous Latent Variables and Exogenous Latent Variables

Latent Variables	α	AVE	CR	Observed Variables	Loading	R^2
Product Innovative (PDTI)	0.92	0.51	0.80	New style (x1)	0.77	0.60
				Improved products (x2)	0.86	0.74
				Production system efficiency (x3)	0.68	0.46
				Demand response (x4)	0.51	0.26
Process Innovative (PCSI)	0.95	0.40	0.76	Process continuity (y1)	0.51	0.26
				Service (y2)	0.70	0.50
				Modern technology (y3)	0.62	0.38
				System evaluation and analysis (y4)	0.53	0.28
				Competitive advantage (y5)	0.76	0.58
Packaging Design (PKD)	0.95	0.42	0.78	Fewer parts (y6)	0.78	0.60
				Security (y7)	0.60	0.36
				Transportation management (y8)	0.74	0.55
				Convenience (y9)	0.42	0.17
4P Marketing Mix Strategy (4PMM)	0.93	0.47	0.77	Product (y10)	0.79	0.63
				Price (y11)	0.49	0.24
				Location (y12)	0.76	0.57
				Marketing promotion (y13)	0.66	0.44
Product Quality (PDQ)	0.94	0.62	0.86	Ready to offer for sale (y14)	0.67	0.45
				Efficiency (y15)	0.92	0.84
				Reliability and confidence in the product (y16)	0.90	0.81
				After-sales service (y17)	0.61	0.37

Table 3: Latent Variable *r* Testing, Mean, SD, Skewness, and Kurtosis Results

Item	PDTI	PCSI	PKD	4PMM	PDQ
Product Innovative (PDTI)	**1**				
Process Innovative (PCSI)	0.49**	**1**			
Packaging Design (PKD)	0.45**	0.41**	**1**		
4P Marketing Mix Strategy (4PMM)	0.43**	0.46**	0.44**	**1**	
Product Quality (PDQ)	0.50**	0.42**	0.47**	0.46**	**1**
Mean	4.49	4.50	4.49	4.48	4.48
Standard deviation (SD)	0.23	0.17	0.22	0.21	0.24
Skewness	0.80	0.45	0.60	0.75	0.78
Kurtosis	0.11	2.23	0.00	0.40	0.03

Table 4: Standard Coefficient of Influence in the Causal Relationship Model of Factors Influencing the Quality of OTOP Snack Food Product Quality (PDQ)

Dependent Variables	R^2	Effect	Independent Variables			
			PDTI	PCSI	PKD	4PMM
Process Innovative (PCSI)	0.10	DE	0.32**			
		IE	–			
		TE	0.32**			
Packaging Design (PKD)	0.12	DE	0.23**	0.19*		
		IE	0.06	–		
		TE	0.29**	0.19*		
Marketing Mix (4PMM)	0.22	DE	–	0.06	0.45**	
		IE	0.15**	0.08*	–	
		TE	0.15**	0.14*	0.45**	
Product Quality (PDQ)	0.27	DE	0.28**	0.04	0.20*	0.22*
		IE	0.10**	0.07*	0.09	–
		TE	0.38**	0.11	0.29**	0.22*

Note: *Sig. ≤ 0.05, **Sig. ≤ 0.01.

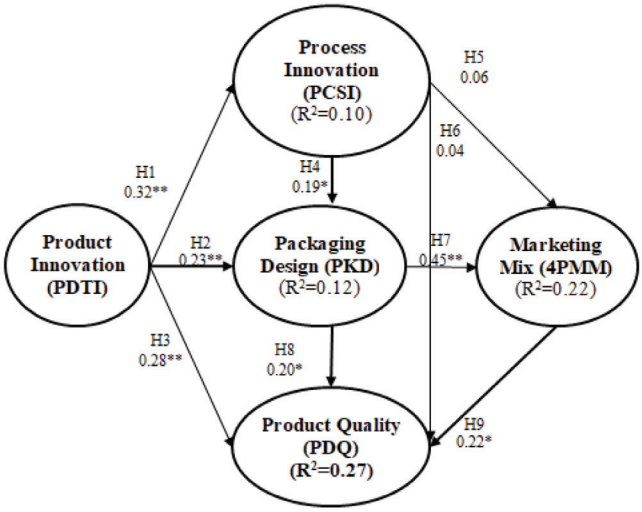

Figure 1: Final SEM for OTOP Snack Product Quality

5. Discussion

The results revealed that all four causal variables positively influenced OTOP snack food product quality, which, when combined as a (TE), had an R^2 value of 27%. Also, the latent variable TE values for PDTI, PKD, 4PMM, and PCSI, were 0.38, 0.29, 0.22 and 0.11, respectively.

5.1. Product Innovation (PDTI) Hypotheses Testing and Descriptive Statistics Results Analysis

Hypotheses testing for PDTI determined that all three hypotheses were supported, with H1 (PDTI to PCSI) showing a weak but positive with r = 0.32, t-value = 3.57, $p \leq 0.01$. H2 was also weak with PDTI to PKD having an r = 0.23, t-value = 2.79, $p \leq 0.05$. Finally, H3 showed that the relationship from PDTI to PQ was also weak as r = 0.28, t-value = 3.65, $p \leq 0.01$.

Moreover, results from the descriptive statistics in Table 5 showed that OTOP food product entrepreneurs felt that PDTI was best achieved through improved products (x2) and production system efficiency (x3). However, new product styles were considered the least important (x1).

This is consistent with OTOP research from Suwannapusit and Chayomchai (2018), who determined that PDTI, PCSI, and management innovation had significant and positive effects on non-financial performance. The authors also suggested that OTOP enterprises should focus on all aspects of innovation because innovations were the critical factors that affected the success and performance of OTOP enterprises.

5.2. Process Innovation (PCSI) Hypotheses Testing and Descriptive Statistics Results Analysis

The three hypotheses testing results for PCSI to PKD showed that H4 was weak but positive (r = 0.19,

t-value = 2.18, $p \leq 0.05$). However, both H5 (PCSI to 4PMM) and H6 (PCSI to PDQ) were unsupported.

Moreover, results from the descriptive statistics in Table 5 showed that OTOP food product entrepreneurs felt that PCSI was best achieved through service (y2) and modern technology (y3). However, competitive advantage was judged as the least important (y5). The need and use of technology in innovation management are also consistent with Lee and Xuan (2019), who determined that the total factor productivity from high-technology exports and innovation and patent applications is positively related to the increase of total output in OECD countries. Aujirapongpan and Jutidharabongse (2020) have also added that the development and use of strategic intuition capability and finding the solution to a problem using correct thinking requires in-depth knowledge of the job to perform one's job daily.

5.3. Packaging Design (PKD) Hypotheses Testing and Descriptive Statistics Results Analysis

The final hypothesis testing in H7 showed a moderate and positive relationship between PKD to 4PMM (r = 0.45, t-value = 7.42, $p \leq 0.01$), as well as a weak but positive relationship in H8 from PKD to PDQ (r = 0.20, t-value = 2.23, $p \leq 0.05$).

Moreover, the descriptive statistics in Table 5 showed that OTOP food product entrepreneurs felt that efficient

Table 5: OTOP Snack Food Product Descriptive Statistics

Observed Variables	Mean	SD	Skewness	Kurtosis	Level
Product Innovation (PDTI)	4.49	0.23	0.80	0.11	SA
New style (x1)	4.45	0.40	0.17	−1.41	SA
Improved products (x2)	4.51	0.38	−0.08	−1.10	MA
Production system efficiency (x3)	4.51	0.37	−0.03	−1.15	MA
Demand response (x4)	4.49	0.38	0.03	−1.23	SA
Process Innovation (PCSI)	4.50	0.17	0.45	2.23	MA
Process continuity (y1)	4.48	0.27	0.33	−0.23	SA
Service (y2)	4.54	0.39	−0.28	−0.96	MA
Modern technology (y3)	4.52	0.30	0.32	−0.77	MA
System evaluation and analysis (y4)	4.49	0.36	−0.08	−0.83	SA
Competitive advantage (y5)	4.46	0.35	−0.18	0.10	SA
Packaging Design (PKD)	4.49	0.22	0.60	0.00	SA
Less parts (y6)	4.43	0.39	0.21	−1.21	SA
Security (y7)	4.50	0.39	−0.04	−1.20	MA
Transportation management (y8)	4.48	0.38	0.08	−1.28	SA
Convenience (y9)	4.57	0.36	−0.26	−0.84	MA
4P Marketing Mix (4PMM)	4.48	0.21	0.75	0.40	SA
Product (y10)	4.52	0.35	−0.07	−0.98	MA
Price (y11)	4.52	0.36	−0.05	−1.02	MA
Location (y12)	4.47	0.35	0.09	−1.00	SA
Marketing promotion (y13)	4.43	0.38	0.25	−1.24	SA
Product Quality (PDQ)	4.48	0.24	0.78	0.03	SA
Ready to offer for sale (y14)	4.49	0.36	0.02	−1.05	SA
Efficiency (y15)	4.47	0.38	0.05	−1.15	SA
Reliability and confidence in the product (y16)	4.50	0.37	−0.01	−1.15	MA
After-sales service (y17)	4.43	0.39	0.20	−1.21	SA

Note. SA: strong agreement; MA: most agreement.

PKD was best achieved through convenience (y9) and security (y7). However, fewer parts were judged as least important (y6).

5.4. 4P Marketing Mix Strategy (4PMM) Hypotheses Testing and Descriptive Statistics Results Analysis

The final hypothesis testing in H9 showed a weak but positive relationship between 4PMM to PDG (r = 0.22, t-value = 1.97, $p \leq 0.05$).

Moreover, results from the descriptive statistics in Table 5 showed that OTOP food product entrepreneurs felt that the 4PMM was best achieved equally through price (y11) and product (y11). However, marketing promotion was judged as the least important (y13).

Birnik and Bowman (2007) added that central to any international marketing strategy is the decision as to which marketing mix elements should be standardized and to what degree.

6. Conclusion and Implications

The authors used an SEM to investigate the interrelationships of five latent variables, their nine hypotheses, and their importance on a Thai OTOP entrepreneur's opinion on what factors contributed most significantly to their enterprise's snack product quality. The results revealed that all four causal variables positively influenced OTOP snack food product quality, combined with an R^2 total effect value of 27%. Also, the latent variable TE values for PDTI, PKD, 4PMM, and PCSI, were 0.38, 0.29, 0.22 and 0.11, respectively. Therefore, product quality is essential to an OTOP export firm's successful growth and sustainability in a highly competitive world. The marketing mix 4Ps must be remembered, with special attention given to product price.

The authors believe that OTOP export sector success depends on management properly designing products to meet the needs and growth of their export customers, assuring their strategic strength. Also, many studies have pointed to the importance of customer satisfaction, which is tied to maintaining efficient and cost-adequate production levels while maintaining a high level of product quality, durability, and standards. Trust between the OTOP export firm and their overseas customers is also critical, which entails delivering products on time as promised with the number of units specified. At the same time, price is a critical factor that must be factored into the firm's marketing mix. Pricing must be competitive, follow market trends, and is reasonable and acceptable. When possible, firms should monitor social media to see how their products are received in the international marketplace and adjust according to the comments.

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