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Antecedents to Consumer Satisfaction with Laundry Detergents and Fabric Softeners in Thailand: A SEM Analysis*

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Abstract

The global laundry detergents market in 2021 was valued at nearly \$121 billion, with consumers being reported as heightening their search for hygienic products capable of fighting viruses. Therefore, the researchers undertook a study to determine how product innovation (PI), product quality (PQ), and product attitude (PA) effects Thai consumers' satisfaction (CS) with their purchase of laundry detergent and fabric softener. After the questionnaire's validity and reliability confirmation, the authors used multi-stage random sampling by region and province in January and February 2022 to collect 520 questionnaires. LISREL 9.10 was used in the CFA and SEM analysis of the six hypotheses, which were determined to be supported. The results showed that all three causal variables positively influenced CS, with a total effect (TE) R^2 value = 87%. Also, latent variable total effect (TE) values showed that PI was strongest (0.93), then PQ (0.56), and finally, PA (0.54). Therefore, consumer satisfaction is essential in a firm's ongoing development and sustainability in a highly competitive, globalized world. Organizations must develop competitive strategies that adjust to consumer needs. Management must monitor online and social media sources where product reviews are given and adjust their strategies accordingly.

Keywords: Product Attitude, Product Innovation, Product Quality, Thailand, Washing Detergent

JEL Classification Code: C12, L15, L67, O31, O32

1. Introduction

In developing nations, manufacturing customer satisfaction has become a pillar of competitiveness and

sustainability (Daragahi, 2018). Therefore, organizations need to adapt to the needs of their consumers, with product innovation a critical element to their success and customer satisfaction (Ayodele & Oginni, 2019; Kahn, 2018). Moreover, user-driven innovation (UDI) is a crucial element in a company's market expansion (Baldassarre et al., 2017), allowing for the development of solutions that provide customer satisfaction and business profitability.

This is consistent with other studies, which suggest a worldwide consumer culture from which an increasingly homogeneous consumer has been proven to have the exact needs and tastes dissimilar to their unique customs and cultures (Alden et al., 2006; Hernani-Merino et al., 2020). These consumers are a new class that shows a similar lifestyle, purchasing patterns, and consumer preferences. However, all this is predicated on global trade barriers falling and the acceleration of market openings (Czarnecka et al., 2020). Despite the cultural differences, global consumers exhibiting the same buying patterns and tastes are emerging as a critical consumer class due to their ability to obtain product information through social media and online sites (Hwang et al., 2021; Anuntarumporn & Sornsaruht, 2022).

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According to a recent McKinsey study, innovation will be more critical than ever coming out of a post-COVID-19 world as the world moves towards the next new normal with increasing changes in consumer occasions and needs (Doshi et al., 2020). Therefore, due to accelerating change, strategic management and its measurement become even more crucial, with winning strategic management models focusing on targeting what consumers need (Dziersk et al., 2018).

As such, product research and development (R&D) units need to provide direction design under these new norms and the changing needs and consumer opportunities. Innovative strategies must meet these needs and drive more efficient and faster growth (Doshi et al., 2020).

However, studies have established the benefits of company size to R&D success (Ibhagui, 2019). That is, larger organizations can devote larger budgets to product R&D, with organizations that invest more in R&D earning more profits than companies that do not (Wang, 2011). Consequently, small and medium-sized enterprises (SMEs) may focus on business support, which slows down product development and ultimately results in poor financial performance (Singhal, 2020). However, an SME's performance can be increased if the entrepreneurs who lead it have strategic intuition (Aujirapongpan et al., 2020).

One consumer segment that is overlooked is the global detergents market which in 2021 was estimated to be valued at \$121 billion (Detergents Market Outlook 2031, 2022), which is expected to have an annual growth rate of 4.3% through 2031. As might be expected, major global firms account for up to 45% of the market's share, with pricing and logistics between raw material suppliers and manufacturers usually taking place on the floors of international conferences.

Moreover, due to the rise in infectious diseases such as COVID-19, consumers have become more health-conscious about cleanliness and hygiene, rapidly increasing the demand for hand sanitizers, laundry, and household cleaning products. This is consistent with Chae (2021), whose research into consumers during the COVID-19 pandemic found that consumers focus on their own health and safety and that of their families as an immediate primary concern. Moreover, in Thailand, where laundry is done in room temperature water (40–60°C is usually suggested to lower germ risk for fabric washing), the need for an additive that can help with killing potential viruses is becoming a consumer need (Does Laundry Detergent Kill Germs? 2022). In Thailand, companies have seen this consumer need. One example is the 'Attack 3D Virus Killer' detergent product produced by Kao Industrial (Thailand) Co., Ltd., which is advertised to kill more than 99.9% of specific viruses and inhibit the formation of bacteria (Attack 3D Virus Killer, 2022).

Therefore, within the laundry detergent sector, consumer satisfaction is now requiring that product innovation take

place. Also, as in the case of Procter & Gamble's (P&G) Tide detergent product, strategic vision and systematized innovation and growth led to P&G's Tide detergent product growing from \$12 billion to \$24 billion globally in a single decade (Brown & Anthony, 2011). P&G also contends that 'disruption' drives growth, which the company interprets as new product offerings that are more convenient, easier to access, simpler, and more affordable. This is consistent with Kahn (2018), who describes innovation as a mindset, process, and outcome.

Another factor that can play an essential role in consumer satisfaction is the quality of the detergent product which some today might interpret as its environmental friendliness (Bajpai & Tyagi, 2007; Uzma et al., 2018). Others view a detergent product by its cleaning power, scent, cost, and capacity. Fung et al. (2007) have pointed out that the key to winning in the specialty products market is the ability of a company to introduce a new product and capture the largest market share as quickly as possible. The authors state that consumer product differentiation is based on product quality and performance. Also, from the company's R&D site, success comes from product innovation in manipulating functional chemicals such as enzymes, zeolites, and surfactants (Bajpai & Tyagi, 2007; Fung et al., 2007).

Therefore, the researchers propose three essential determinants of laundry detergent consumer satisfaction. These are product innovation (PI), product quality (PQ), and product attitude (PA).

2. Literature Review

2.1. Product Innovation (PI)

In a study concerning Indonesian cosmetic products, Putriana et al. (2019) stated that PI is a method in which problems are solved by creating firm economic value and community social value. Other studies have suggested that innovation strategies can lead to customer loyalty (Nhepera & Darlington, 2017). Zghoul and Al-Haddad (2021) have added that PI is a process of introducing something new and unique to increase a firm's market potential. However, it must have product quality and meets consumers' needs and expectations.

Daragahi (2018) examined how product innovation affects customer satisfaction and determined there were five indicators in the process. These were 1) present something new and unique that none of the competitors have 2) increase market potential that increases market share, 3) use consumer input to create innovation, 4) design products that are more suitable for consumers and of better quality, and 5) produce innovative products that meet specific consumer needs.

This is consistent with Seng and Ping (2016), who indicated that PI creates value and must be unique or

innovative by adding features that elevate a product to a higher level. This is consistent with Hwang et al. (2021), whose research on botanical anti-aging cream reported there are five elements involved in PI. These are 1) present something new and unique that none of the competitors have 2) PI increases market share potential through company marketing, 3) using consumer data to create innovation, 4) designing products that are more suitable for consumers and of better quality, and (5) innovative products that meet specific consumer needs. Finally, as West (2002) has explicitly stated, creativity is idea development, while innovation is idea application.

2.2. Product Quality (PQ)

Many authors have discussed what constitutes PQ, with Daragahi (2018) suggesting it is the ability to deliver quality products that meet consumer expectations and offer a product that works for an optimal lifetime. This is consistent with Suchánek and Králová (2019), who describe PQ as the ability to offer products that are reliable, safe to use, meet consumer demand, and offer high-value products to consumers.

2.3. Product Attitude (PA)

Asgari and Hosseini (2015) explored consumer attitudes towards products and identified two types of consumers. One was an individual from a culture supporting individualism who bought products to stand out in a crowd. However, the other type of consumer came from a collective culture and tended to choose brands and products that connected them with specific groups. Other research from Boon et al. (2020) on natural skincare products suggested that consumers wanted various products which had consistent quality. They also wanted safe, modern products that were suitable for consumers and that had a reputation of high standards, which builds consumer credibility.

2.4. Customer Satisfaction (CS)

Namini (2016) researched CS and indicated that it should be every firm's strategic goal, as CS increases profitability and loyalty. Also, obtaining CS requires products that meet the consumer's requirements and expectations. Products must also be helpful and worthwhile, have value for money, and are satisfying products. This is consistent with consumer research in Indonesia in which Ginting and Sembiring (2018) found that both PI and PQ made a significant contribution to tourist purchase of local woven fabric souvenirs. Likewise, Alsukri et al. (2022) determined that PI and service quality had very strong and positive effects on CS and customer loyalty in the purchase of Honda motorcycles in Indonesia.

2.5. Research Objectives

1. To investigate how the proposed latent variables and their associated observed variables influence each other and their effect on CS from the development and analysis of a structural equation model (SEM) model.
2. To assess the proposed model's goodness of fit (GOF) and confirmatory factor analysis (CFA) before the SEM.

2.6. Hypotheses Statements

The authors propose the following six hypotheses.

H1: *PI has a direct influence on PA.*

H2: *PI directly influences CS*

H3: *PI has a direct influence on PQ.*

H4: *PQ has a direct influence on CS.*

H5: *PQ has a direct influence on PA.*

H6: *PA has a direct influence on CS.*

3. Methods and Materials

3.1. Population and Sample

The study's population consisted of Thai consumers in four regions and eight provinces who 2022 purchased detergent and fabric softener products more than one time. Numerous scholars have suggested that sample size determination can be made by obtaining 10–20 questionnaires per observed variable (Hair et al., 2021; Schumacker & Lomax, 2016). However, researchers such as Brown (2015) and Kyriazos (2018) have stated that the sample size influences the precision and statistical power of CFA and SEM parameter estimates. Therefore, researchers should increase their sample size accordingly. Also, especially in studies that involve large geographical areas in sampling, increasing sample size is suggested due to sampling error and incomplete questionnaires, and the inability to go back to the exact location due to cost and time constraints. Therefore, to assure reliability, potential non-response errors, low response rates, and incomplete surveys (Dillman et al., 2013; Millar & Dillman, 2012; Pielsticker & Hiebl, 2020), the authors extended the target to 520.

Furthermore, to assure statistical sampling validity, the authors sampled consumers from four Thai regions (north, northeast, central and southern) and the Bangkok metropolitan area. For these areas, the population is reported to be 19,065,216 individuals. Therefore, multi-stage random sampling was first used to target which stores in which areas were to be used for the survey in the eight provinces (Chonburi, Samut Prakan, Chiang Mai, Chiang Rai, Nakhon

Ratchasima, Ubon Ratchathani, Nakhon Si Thammarat, and Songkhla) and Bangkok (Leekitchwatana & Pimdee, 2021). After that, we authors used simple random sampling to choose consumers in each of the targeted provinces. This process led to 152 consumers from Bangkok, 43 from Chonburi province, 37 from Samut Prakan province, 49 from Chiang Mai province, 35 from Chiang Rai province, 72 from Nakhon Ratchasima province, 51 from Ubon Ratchathani province, 42 from Nakhon Si Thammarat province, and finally, 39 from Songkhla province.

3.2. Questionnaire Design

The tool used to collect the consumer information was a questionnaire that contained five sections. These were:

Section 1 contained items about each consumer's personal information, washing detergent, and fabric softener buying habits. This included items concerning their gender, age range, educational level, relationship status, occupation, income, purchase frequency of combined laundry detergent and fabric softener products, and the price of each detergent mixed with fabric softener (Table 1).

Section 2 was concerned with items about product Innovation (PI). It used a five-level agreement scale to assess consumer agreement with the items and contained items about new product (x1) design to optimize performance or usability. There was an item concerning PI creativity (x2) and PI benefits (x3), which were concerned with a new style design different from older products. It is then suggested that this affects the business model, which results in higher efficiency, and the ability to meet consumer demands in changing situations and enhance competitiveness.

Section 3 was concerned with three items about consumer product attitudes (PA) which were again measured using a five-level agreement scale. It contained three items about each consumer's feelings about the product by learning from experiences and things around you. There were three components which were a consumer's intellectual understanding (knowledge, perception, and belief) and the second part is their emotion or feeling about a product. Finally, their behavior (y3) in what they do, such as purchasing one or another product for whatever reason.

Section 4 was concerned with three items about consumer satisfaction (CS) which was again measured using a five-level agreement scale. It contained three items about consumer preferences for a product or service. These included its value (y4), promotional aspects (y5), and consumer services (y6).

Section 5 was concerned with three items about product quality (PQ) which was again measured using a five-level agreement scale. It contained three items about products suitable for use, whether they had a good design, durability, stability, good condition, and can be used and performed as advertised. The functions and details of the product are

in accordance with the specified standards. This was then categorized as needs requirement (y7), product performance (y8), and reliability (y9).

The questionnaire used a 5-level scale to indicate each consumer's level of agreement with each item's statement, with '5' indicating the 'most agreement' (4.51–5.00), '4' indicating 'strong agreement' (3.51–4.50), '3' indicating 'moderate agreement' (2.51–3.50), '2' indicating 'little agreement' (1.51–2.50), and finally '1' meaning 'little or no agreement' (1.00–1.50). Finally, the range of Cronbach alpha values was 0.89 to 0.95 (Table 2).

3.3. Assessment of Questionnaire Quality

After the design of the questionnaire, six experts assisted with the evaluation of the questionnaire's content validity (CV). A CV check is essential as it ensures the validity and strength of the research design, the questionnaire's variable selection accuracy, and how they are subsequently measured. The researcher used Cronbach's alpha (α) values and Taber's (2018) evaluation criteria suggestions and determined that the CV check was 'robust' to 'strong' for the study's α values of 0.89 to 0.95 (Table 2).

3.4. Questionnaire Try-Out

A try-out of the questionnaire made use of 35 consumers from the local area surrounding the authors' university who volunteered to help with the questionnaire's item evaluation process, relevance, and clarity (Pimdee, 2020). None of the try-out participants or their questionnaires were used in the final study's data collection.

3.5. Data Collection

The authors collected data using consumer questionnaires from buyers of mixed laundry detergent and fabric softener products. Research assistants from the authors' faculty were used to collect data in Bangkok and eight outlying Thai provinces in four regions. The actual survey took place between January and February 2022. The sampling method identified multiple stores, including TOP Supermarket, Good Made Market Home, Fresh Mart, Max Value, Tesco Lotus, Big C Supercenter, Mini Big C, 7-Eleven, Family Mart, CJ supermarket, and 108 Convenience Shops. The consumer selection process then began with the identification of every fifth consumer entering a retail outlet between the hours of 16:00 to 20:00 with a single question of each survey candidate. This was, "Have you ever purchased a laundry detergent with a fabric softener agent before?" If the answer was yes, permission was asked to complete a university consumer survey. This process continued until 520 complete questionnaires were obtained.

3.6. Data Analysis

Data analysis was undertaken using LISRE 9.1 to ascertain the SEM results' validity and the variables' effect on Thai consumer satisfaction and their interrelationships. If the calculated statistic met the theory and LISREL 9.1 program's criteria, the model was determined to be accurate and consistent with the empirical data.

4. Results

4.1. Survey Respondents' Information

Table 1 shows the results from the 520 individual consumer satisfaction surveys. Firstly, we note that 87.12% were women, with 41.35% between 20 to 30 years of age and another 47.12% between 31 to 40 years of age. Most consumers obtained a vocational certificate or diploma

Table 1: Respondents' Information (*n* = 520)

Respondent Information		Frequency	Percent
Gender	Men	67	12.88
	Women	453	87.12
Consumer Age	Under 20 years old.	9	1.73
	From 20 to 30 years old.	215	41.35
	From 31 to 40 years old.	245	47.12
	41 years old or older,	51	9.81
Level of Education	Secondary school/vocational certificate/or equivalent	84	16.15
	Vocational Certificate/Diploma	220	42.31
	Bachelor's degree or above	216	41.54
Relationship Status	Single	217	41.73
	In a relationship/married.	280	53.85
	Divorced/widowed.	23	4.42
Occupation	Government service	73	14.04
	State enterprise	77	14.81
	Private company	188	36.15
	Entrepreneur	182	35.00
Monthly Income	Less than \$276 per month (10,000 THB).	40	7.69
	\$276–\$551 (10,000–20,000 THB) per month.	252	48.46
	\$551–\$828 (20,001–30,000 THB) per month.	191	36.73
	\$828–\$1,101 (30,001–40,000 THB) per month.	17	3.27
	Over \$1,101 (40,001 THB) per month.	20	3.85
Product purchase frequency of mixed detergent and fabric softener	I buy it every week.	420	80.77
	I buy once every two weeks.	67	12.88
	I buy once every three weeks.	23	4.42
	I buy it once a month.	10	1.92
How much did your laundry detergent mixed with softener cost each time? fabric softener?	Less than \$1.38 (50 THB).	46	8.85
	\$1.38–\$2.75 (50–100 THB)	138	26.54
	\$2.75–\$4.13 (101–150 THB)	168	32.31
	\$4.13–\$5.50 (151–200 THB)	103	19.81
	More than \$5.50 (200 THB)	65	12.50

(42.31%) or a bachelor’s degree or above (41.54%). A majority also indicated they were in a relationship or married (53.85%), while another 41.73% indicated they were single and alone. Concerning each consumer’s occupation, 36.15% indicated they were employed in private companies, while 35% indicated they were self-employed. When asked how much each consumer earned per month, 85.19% revealed they earned 10,000 to 30,000 Thai baht per month (\$276 to \$828).

When each was asked about their product purchasing information, 80.77% said they purchased a laundry detergent with fabric softener every week. In response to how much they spent, the answers were much dispersed, most probably indicating some were buying in bulk or on special.

4.2. Goodness-Of-Fit (GOF) Analysis

Jöreskog et al. (2016) have written that a CFA should be done to assess the model’s construct validity (CV). Moreover, it is suggested that strong *construct validity* should have high *discriminate* and *convergent validity* (Westen & Rosenthol, 2003). Additionally, when researchers use LISREL 9.1 software, χ^2 and $\chi^{2/df}$ (relative Chi-square) values are created whose commonly accepted criteria for validity are $p \geq 0.05$ and ≤ 2.00 , respectively (Hooper et al., 2008). LISREL 9.1 also creates values for other indices, including the goodness of fit index (GFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Suggested values for these are ≥ 0.90 , ≥ 0.95 , and ≤ 0.05 , respectively.

Also, Schumacker and Lomax (2016) suggested 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 (Schumacker & Lomax, 2016). Therefore, all the GOF values significantly exceeded the suggested minimal GOF criterion, implying that the model fit was excellent as $\chi^2 = 0.33$, $\chi^{2/df} = 1.08$, RMSEA = 0.01, GFI = 0.98, AGFI = 0.97, RMR = 0.01, SRMR = 0.01, NFI = 0.99, and finally, the CFI = 1.00. Finally, Cronbach Alpha values (0.89–0.95) also exceeded the commonly accepted value ≥ 0.70 (Tavakol & Dennick, 2011).

4.3. CFA Results

Table 2 details the CFA reliability and validity results, the Cronbach’s α values (0.89–0.95) (Tavakol & Dennick, 2011), the average variance extracted (AVE) values (0.71–0.84), and the construct reliabilities (CR) (0.88–0.94). Hair et al. (2021) indicated that construct validity (CV) determination should use the AVE, main loading correlations, and the CR. Acceptable values for these indices are AVE ≥ 0.5 and CR ≥ 0.6 (Fornell & Larcker, 1981).

4.4. Correlation Coefficients (r) of the Latent Variables

Table 3 shows the r testing results, commonly interpreted as 0.50–1, representing strong correlations. Henseler et al.

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 Innovation (PI)	0.90	0.82	0.93	New products (x1)	0.85	0.72
				Creativity (x2)	0.93	0.87
				Benefit (x3)	0.93	0.87
Product Attitude (PA)	0.93	0.84	0.94	Intellectual understanding (knowledge, perception, and belief) (y1)	0.93	0.86
				Emotional (y2)	0.90	0.81
				Behavioral (y3)	0.92	0.85
Customer Satisfaction (CS)	0.95	0.76	0.91	Value for money (y4)	0.89	0.80
				Promotional aspect (y5)	0.89	0.79
				Customer Service (Unit giving or receiving customer information) (y6)	0.84	0.71
Product Quality (PQ)	0.89	0.71	0.88	Needs requirement (y7)	0.89	0.80
				Product performance (y8)	0.82	0.67
				Reliability (y9)	0.82	0.67

(2015) suggested that discriminant validity is confirmed when standardized factor loading values ≥ 0.60 .

4.5. Mediation Effects

Table 4's results indicate that all the model's causal variables had a positive effect on CS, with a combined R^2 value = of 87%. Additionally, the total effect (TE) ranking of the latent variable values determined that PI was strongest, followed by PQ, and then PA, 0.93, 0.56, and 0.54, respectively.

Table 3: Latent Variables r Values

Measurement Item	PI	PQ	PA	CS
Product Innovation (PI)	1			
Product Quality (PQ)	0.80**	1		
Product Attitude (PA)	0.87**	0.82**	1	
Customer Satisfaction (CS)	0.85**	0.88**	0.89**	1
Mean	3.67	3.75	3.77	3.75
Standard deviation (SD)	0.96	0.87	0.97	0.91
Skewness	-0.84	-0.81	-0.88	-0.91
Kurtosis	0.02	0.25	0.12	0.32

Table 4: Standard Coefficient of Influence Factors Affecting Consumer Satisfaction

Dependent variables	R^2	Effect	PI	PQ	PA
Product Quality (PQ)	0.77	DE	0.88**		
		IE	-		
		TE	0.88**		
Product Attitude (PA)	0.86	DE	0.53**	0.45**	
		IE	0.49**	-	
		TE	0.93**	0.45**	
Customer Satisfaction (CS)	0.87	DE	0.15*	0.32**	0.54**
		IE	0.78**	0.24**	-
		TE	0.93**	0.56**	0.54**

Note: *Sig. < 0.05, **Sig. \leq 0.01.

4.6. Testing of the Hypotheses

Results from the hypotheses testing revealed that all six hypotheses were consistent with the data and supported (Figure 1).

5. Discussion

The results revealed that all three causal variables positively influenced CS, which, after their total effect (TE), had an R^2 value of 87%. Also, the latent variable values of PI, ST, and PQ when ranked by TE were 0.93, 0.56, and 0.54, respectively.

5.1. Product Innovation (PI) Hypotheses testing and Descriptive Statistics Results Analysis

Results for the first three hypotheses revealed that all three were supported, with H1 of moderate strength as PI to PA was $r = 0.53$, t -value = 8.00, $p \leq 0.01$. H2 was weak with PI to CS having an $r = 0.15$, t -value = 2.22, $p \leq 0.05$. Finally, H3 with PI to PQ was very strong with $r = 0.88$, t -value = 21.30, $p \leq 0.01$.

Additionally, the study's descriptive statistics analysis (Table 5) showed that Thai consumers felt that when it came to PI, creativity (x2) and benefits (x3) were equally important. However, they are somewhat less critical than new products (x1).

These findings are consistent with Daragahi (2018), who verified the strong and positive relationship between innovation and CS, especially when after-sales services were involved. In another study concerning consumer loyalty and PI in cosmetics products, Nhepera and Darlington (2017) found that consumer concerns for product pricing and benefits provided are high. Finally, Lee and Xuan (2019) stated the

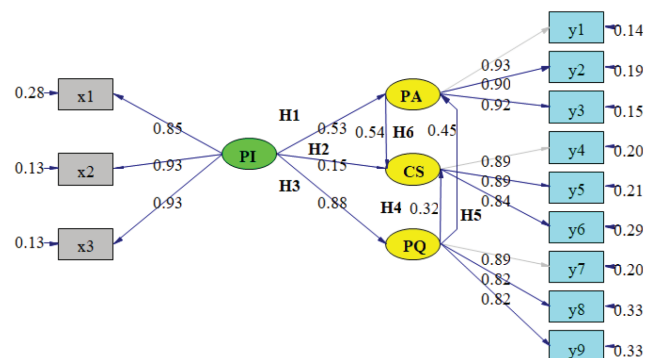


Figure 1: Final SEM for Consumer Satisfaction (CS)

Note: RMSEA = 0.013; Chi-Square = 34.85; df = 32; p -value = 0.33413.

Table 5: Descriptive Statistics

Aspects/Items	Mean	SD	Skewness	Kurtosis
Product Innovation (PI)	3.67	0.96	-0.84	0.02
New products (x1)	3.53	1.05	-0.51	-0.36
Creativity (x2)	3.72	1.07	-0.78	-0.11
Benefit (x3)	3.72	0.98	-0.80	-0.04
Product Attitude (PA)	3.77	0.97	-0.88	0.12
Intellectual understanding (knowledge, perception, and belief) (y1)	3.71	1.03	-0.73	-0.18
Emotional (y2)	3.80	1.06	-0.80	-0.15
Behavioral (y3)	3.81	1.02	-0.85	0.03
Customer Satisfaction (CS)	3.75	0.91	-0.91	0.32
Value for money (y4)	3.81	1.00	-0.87	0.28
Promotional aspect (y5)	3.69	0.98	-0.78	0.12
Customer Service (Unit giving or receiving customer information) (y6)	3.75	0.97	-0.78	0.11
Product Quality (PQ)	3.75	0.87	-0.81	0.25
Needs requirement (y7)	3.71	0.97	-0.74	0.25
Product performance (y8)	3.73	0.94	-0.63	-0.06
Reliability (y9)	3.80	0.95	-0.71	-0.01

importance of governments and industry combining in the quest for technological progress and product innovation.

5.2. Product Quality (PQ) Hypotheses testing and Descriptive Statistics Results Analysis

The two hypotheses testing results for PQ showed that H4 was weak but positive ($r = 0.32$, t -value = 3.78, $p \leq 0.01$) while H5 was somewhat stronger and also positive ($r = 0.45$, t -value = 6.76, $p \leq 0.01$). Also, from the study's analysis, PQ was tied to its reliability the most (mean = 3.80, SD = .95). Somewhat lower were the product's performance (mean = 3.73, SD = .94) and the consumer's perception of their need for the product (mean = 3.71, SD = .97).

This is consistent with other studies in which Hoe and Mansori (2018) reported that product reliability was a critical factor in consumer satisfaction within the Malaysian engineering sector.

5.3. Product Attitude (PA) Hypotheses testing and Descriptive Statistics Results Analysis

The final hypothesis testing in H6 showed moderate and positive relationship between PA to CS ($r = 0.54$, t -value = 5.33, $p \leq 0.01$). Additionally, the study's analysis showed that consumers placed higher importance on behavioral (mean = 3.81, SD = 1.02) and emotional values (mean = 3.80, SD = 1.06) over intellectual values (mean = 3.71, SD = 1.03).

These findings are consistent with Suh and Youjiae (2006), who indicated the importance of consumer product involvement through advertising and corporate images in customer satisfaction and loyalty relationships. This is consistent with Wang et al. (2018). They researched product attribute relationships in customer satisfaction from online reviews of washing machines and reported the critical nature of this information source in analyzing user demands. Also, the authors listed seven essential features for consumers before purchasing a washing machine. They suggested that consumers who purchased cheaper products should be 'treated differently' than those who bought more expensive products.

6. Conclusion and Limitations

The study explored how Thai consumers felt about the effects of product innovation, product quality, and their product attitude on their consumer satisfaction with the purchase and use of laundry detergents combined with fabric softeners. This is a unique study with few if any other studies on the topic using these factors. The study also highlighted that product quality in the eyes of the consumer now entails how environmentally friendly the product is and how harsh the chemicals used are on the groundwater and crops. Therefore, future studies need to explore how product quality now relates to environmental friendliness.

The researchers used latent variable path analysis and SEM to investigate the interrelationships of four latent variables, their six hypotheses, and their importance on a consumer's decision to use a laundry detergent and a fabric softener together. The results revealed that all three causal variables positively affected *consumer satisfaction* (CS), with a total effect (TE) R^2 value, = 87%. Also, values for the latent variables, when ranked by total effect (TE) values, were *product innovation* (PI), *product quality* (PQ), and *product attitude* (PA), with TE values of 0.93, 0.56, and 0.54, respectively.

Therefore, consumer satisfaction is essential in a firm's ongoing development and sustainability in a highly competitive, globalized world. Organizations must develop competitive strategies that adjust to consumer needs. Management must monitor online and social media sources where product reviews are given and adjust their strategies accordingly. Therefore, companies can gain a competitive advantage by creating and implementing innovative strategies different from their competitors.

Although Thailand was still under the COVID-19 pandemic emergency decree in the first two months of 2022, the researchers managed to disperse multiple questionnaire collection teams to eight provinces and the Bangkok metropolitan area to interview in-store shoppers. However, online shopping and home delivery are becoming a trend that we suspect will not end after the pandemic emergency. Therefore, future studies need to consider this rising phenomenon and build hybrid sampling processes that consider brick and mortar shoppers and online shoppers together.

References

- Alden, D. L., Steenkamp, J. E. M., & Batra, R. (2006). Consumer attitudes toward marketplace globalization: Structure, antecedents, and consequences. *International Journal of Research in Marketing*, 23(3), 227–239. <https://doi.org/10.1016/j.ijresmar.2006.01.010>
- Alsukri, S., Miran, I., Cakranegara, P. A., & Prihastuti, A. H. (2022). Customer satisfaction mediates the effect of product innovation and service quality on customer loyalty. *Inovasi*, 18(1), 30–38. <https://tinyurl.com/46ju4xee>
- Anuntarporn, N., & Sornsaruht, P. (2022). The impact of innovation capability of firms on competitive advantage: An empirical study of the ICT industry in Thailand. *Journal of Asian Finance, Economics, and Business*, 9(2), 121–131. <https://doi.org/10.13106/jafeb.2022.vol9.no2.0121>
- Asgari, O., & Hosseini, M. S. (2015). Exploring the antecedents affecting attitude, satisfaction, and loyalty towards Korean cosmetic brands. *Journal of Distribution Science*, 13(6), 45–70. <https://tinyurl.com/ye23p7b9>. <https://doi.org/10.15722/jds.13.6.201506.45>
- Attack 3D Virus Killer. (2022). 3D virus killer concentrated powder detergent 750G. *Gourmet Thailand*. <https://tinyurl.com/23569t94>
- Aujirapongpan, S., Ru-zhe, J., & Jutidharabongse, J. (2020). Strategic intuition capability toward the performance of entrepreneurs: Evidence from Thailand. *Journal of Asian Finance, Economics, and Business*, 7(6), 465–473. <https://doi.org/10.13106/jafeb.2020.vol7.no6.465>
- Ayodele, M. S., & Oginni, B. O. (2019). Effect of product innovation on customer satisfaction: An overview of insight into Nigerian Service Market. *Noble International Journal of Social Sciences Research*, 4(01), 1–7. <https://tinyurl.com/2kzce7vz>
- Bajpai, D., & Tyagi, V. K. (2007). Laundry detergents: An overview. *J-Stage. Journal of Oleo Science*, 56(7), 327–340. <https://doi.org/10.5650/jos.56.327>
- Baldassarre, B., Calabretta, G., Bocken, N. M. P., & Jaskiewicz, T. (2017). Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design. *Journal of Cleaner Production*, 147, 175–186. <https://doi.org/10.1016/j.jclepro.2017.01.081>
- Boon, L. K., Fern, Y. S., & Chee, L. H. (2020). Generation Y's purchase intention towards natural skin care products: A PLS-SEM analysis. *Global Business and Management Research*, 12(1), 61–77.
- Brown, B., & Anthony, S. D. (2011, June). How P&G tripled its innovation success rate. *Harvard Business Review*. <https://tinyurl.com/3x7xshyz>
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed). NY: Guilford Press.
- Chae, M. J. (2021). Effects of the COVID-19 pandemic on sustainable consumption. *Social Behavior and Personality: An International Journal*, 49(6), 1–13. <https://doi.org/10.2224/sbp.10199>
- Czarnecka, B., Schivinski, B., & Keles, S. (2020). How values of individualism and collectivism influence impulsive buying and money budgeting: The mediating role of acculturation to global consumer culture. *Journal of Consumer Behaviour*, 19(5), 505–522. <https://doi.org/10.1002/cb.1833>
- Daragahi, G. A. (2018). Impact of innovation on customer satisfaction: A study of the Iranian cosmetics products users. *Revista Venezolana de Gerencia*, 22(78), 88–105. <https://tinyurl.com/6f6s4hv8>. <https://doi.org/10.31876/revista.v22i78.23561>
- Detergents Market Outlook 2031. (2022). *Transparency market research*. <https://tinyurl.com/265dp9kp>
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2013). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. Wiley.
- Does Laundry Detergent Kill Germs? (2022). Your questions are answered. *Persil*. <https://tinyurl.com/5fsu3rmf>
- Doshi, V., Stacey Haas, S., & Jon McClain, J. (2020). *Will innovations finally add up for consumer goods companies?* McKinsey & Company. <https://tinyurl.com/25hhmm38>
- Dziersk, M., Haas, S., McClain, J., & Quinn, B. (2018). *From lab to leader: How consumer companies can drive growth at scale*

- with disruptive innovation. McKinsey & Company. <https://tinyurl.com/2p892pjj>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Fung, H. K., Wibowo, C., & Ng, K. M. (2007). Product-centered process synthesis and development: detergents. *Computer Aided Chemical Engineering*, 11, 239–274. [https://doi.org/10.1016/S1570-7946\(07\)80011-3](https://doi.org/10.1016/S1570-7946(07)80011-3)
- Ginting, M., & Sembiring, H. (2018). *The effect of product innovation, product quality, and city image on purchase decision of Uis Karo woven fabric*. <https://tinyurl.com/2srkf3j4>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. NJ: Sage publications.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hernani-Merino, M., Lazo Lazo, J. G., Talavera López, A., Mazzon, J. A., & López-Tafur, G. (2020). An international market segmentation model based on susceptibility to global consumer culture. *Cross Cultural and Strategic Management*, 28(1), 108–128. <https://doi.org/10.1108/CCSM-04-2019-0081>
- Hoe, L. C., & Mansori, S. (2018). The effects of product quality on customer satisfaction and loyalty: Evidence from the Malaysian engineering industry. *International Journal of Industrial Marketing*, 3(1), 20. <https://doi.org/10.5296/ijim.v3i1.13959>
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal on Business Research Methods*, 6(1), 53–60. <https://doi.org/10.21427/D7CF7R>
- Hwang, J. K., Kim, E. J., Lee, S. M., & Lee, Y. K. (2021). Impact of susceptibility to global consumer culture on commitment and loyalty in botanic cosmetic brands. *Sustainability*, 13(2), 892. <https://doi.org/10.3390/su13020892>
- Ibhagui, O. (2019). Do large firms benefit more from R&D investment? *European Journal of Applied Economics*, 16(2), 155–173. <https://doi.org/10.5937/EJAE16-21770>
- Jöreskog, K. G., Olsson, U. H., & Wallentin, F. Y. (2016). *Multivariate analysis with LISREL*. NY: Springer. <https://doi.org/10.1007/978-3-319-33153-9>
- Kahn, K. B. (2018). Understanding innovation. *Business Horizons*, 61(3), 453–460. <https://doi.org/10.1016/j.bushor.2018.01.011>
- Kyriazos, T. A. (2018). Applied psychometrics: Sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, 09(8), 2207–2230. <https://doi.org/10.4236/psych.2018.98126>
- Lee, J. W., & Xuan, Y. (2019). Effects of technology and innovation management and total factor productivity on the economic growth of China. *Journal of Asian Finance, Economics, and Business*, 6(2), 63–73. <https://doi.org/10.13106/jafeb.2019.vol6.no2.63>
- Leekitchwatana, P., & Pimdee, P. (2021). An analysis of Thai student–teacher appropriate Internet use behavior. *International Journal of Emerging Technologies in Learning*, 16(2), 254–271. <https://doi.org/10.3991/ijet.v16i02.13747>
- Millar, M. M., & Dillman, D. A. (2012). Encouraging survey response via smartphones. *Survey Practice*, 5(3), 1–6. <http://doi.org/10.29115/SP-2012-0018>
- Namini, N. S. (2016). *Effective factors on customer satisfaction and customer loyalty in FMCGs* [Doctoral Dissertation]. Swiss Management Center (Switzerland).
- Nhepera, N., & Darlington, O. (2017). An examination of the importance of hotel innovation on guest loyalty in Cape Town, South Africa. *Acta Universitatis Danubius (Economica)*, 15(2), 70–81. <https://tinyurl.com/35uhmub9>
- Pielsticker, D. I., & Hiebl, M. R. W. (2020). Survey response rates in family business research. *European Management Review*, 17(1), 327–346. <http://doi.org/10.1111/emre.12375>
- Pimdee, P. (2020). Antecedents of Thai student–teacher sustainable consumption behavior. *Heliyon*, 6(8), e04676. <https://doi.org/10.1016/j.heliyon.2020.e04676>
- Putriana, L., Herawati, A., Kaniati, R., & Hatta, I. H. (2019). Consumer loyalty analysis of cosmetic products in Indonesia. *International Journal of Business, Economics and Law*, 19(5), 104–110. <https://tinyurl.com/55vvtetr>
- Schumacker, R. E., & Lomax, R. G. (2016). *A beginner's guide to structural equation modeling* (4th ed). London: Routledge.
- Seng, L. C., & Ping, N. S. (2016). The influence of product innovation on consumer purchase intention. *International Journal of Economics, Commerce and Management*, 4(4), 773–782. <https://tinyurl.com/4ze8djhz>
- Singhal, S. (2020). *Seven healthcare industry trends to watch in 2020*. McKinsey and Company. <https://tinyurl.com/nhd8rht9>
- Suchánek, P., & Králová, M. (2019). Customer satisfaction, loyalty, knowledge, and competitiveness in the food industry. *Economic Research-Ekonomska Istraživanja*, 32(1), 1237–1255. <https://doi.org/10.1080/1331677X.2019.1627893>
- Suh, J. C., & Youjae, Y. (2006). When brand attitudes affect the customer satisfaction-loyalty relation: The moderating role of product involvement. *Journal of Consumer Psychology*, 16(2), 145–155. https://doi.org/10.1207/s15327663jcp1602_5
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- Uzma, S., Khan, S., Murad, W., Taimur, N., & Azizullah, A. (2018). Phytotoxic effects of two commonly used laundry detergents

- on germination, growth, and biochemical characteristics of maize (*Zea mays L.*) seedlings. *Environmental Monitoring and Assessment*, 190(11), 651. <https://doi.org/10.1007/s10661-018-7031-6>
- Wang, Q. (2011). Fixed-effect panel threshold model using Stata. *STATA Journal: Promoting Communications on Statistics and Stata*, 15(1), 121–134. <https://doi.org/10.1177/1536867X1501500108>
- Wang, Y., Lu, X., & Tan, Y. (2018). Impact of product attributes on customer satisfaction: An analysis of online reviews for washing machines. *Electronic Commerce Research and Applications*, 29, 1–11. <https://doi.org/10.1016/j.elerap.2018.03.003>
- West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology*, 51(3), 355–387. <https://doi.org/10.1111/1464-0597.00951>
- Westen, D., & Rosenthal, R. (2003). Quantifying construct validity: Two simple measures. *Journal of Personality and Social Psychology*, 84(3), 608–618. <https://doi.org/10.1037//0022-3514.84.3.608>
- Zghoul, H., & Al Haddad, M. M. (2021). The influence of product innovation on customer satisfaction in the pharmaceutical sector in Jordan. *International Journal of Applied Research on Public Health Management*, 6(1), 45–63. <https://tinyurl.com/ye7u68hh>