Consumer segmentation based on Thai silk and silk productsusing k-means cluster analysis

Walailak Atthirawong*[1]
[*1]Department of Statistics, School of Sience
King Mongkut's Institute of Technology Ladkrabang, Bangkok10520, Thailand
E-mail: walailaknoi@gmail.com, Mobile Phone: +66-9675 0621

Wariya Panprung[2]
[2] Faculty of Management Sciences, Phranakhon Rajabhat University, Bangkok10220,
Thailand, E-mail: noiwari@gmail.com Mobile Phone: +66-15757523

Abstract
Silk weaving is a folk craft passed down from generation to generation – part of Thai region's cultural heritage. It has also been significant in the local economy for centuries. Thai silk has also been recognized international for its beauty and unique characteristics, so that some consider it the best silk in the world. This paper aimed to 1) study factors influencing consumer decisions to buy Thai silk and silk products, and 2) segment the consumers according to their purchasing behaviors on marketing mix strategies. A structured questionnaire gathered information from 312 across the country. Factor analysis revealed that there were six criteria influencing consumer behaviors on Thai silk and Thai silk products *i.e.ease of buying, product charm, publicity, easy access, product characteristics and sales promotion.k*-means cluster analysis was used to segment consumer behavior, based towards their views on those six criteria; it indicated that there were two major consumer decision-making styles -*"taste-oriented"* and*"convenience–seeking"*. Finally, practical implications and strategies for policy makers and businesses *i.e.* product development, target market, coverage and value-added strategies were then proposed and discussed.

Keywords: Cluster analysis, Consumer behavior, Marketing mix,Segmentation, Thai silk

Introduction

"Thai silk" or "Mai Thai", the Queen of Fabrics, is famous for its beauty,uniqueand special qualities; it isproduced from the cocoons of Thai silkworms (Bombyx mori).The cocoon is small, gentle, shiny and light. For a genuine native variety, despite its silk is thin but sticky and springy. Household silk production is found almost in all regions, especially in the northeast and the north of Thailand.More than 200 groups of textile weavers have been established across the country, for local distribution and export(Hoonwongsa, 2017).In silk production, Thai workers in rural areasareemployed. This generates income for the workers and entrepreneurs, mostly small and mediumsize businesses. The process of cleaning Thai silk is very simple and can be cleaned in various ways such as washing liquid, soap or shampoo.Thailand is considered the foremost country in ASEAN region, in terms of both research and unique products, with short threads and rough knots(Anonymous, 2014). Ministry of Agriculture and Cooperatives issues a "peacock" logo to certify trademark of Thai silk standards, guarantee the quality of Thai silk and protect it from imitations.

7760

Under this logo, all silk certified must be produced in Thailand and be environment-friendly.Presently, demand for silk and silk products has currently been graduallyrising in both domestic and foreign markets(The Nation, 2019). Besides, Thailand has the talent to produce Thai silk products from yarn to clothing or other products.

However, the market environment is changing drastically, resulting in changing customer buying patterns. Hence, it is necessary to explore consumer buying behavior for particular products regularly. By understanding the factors, that influence customers, and segment them into groups of behaviors, it will help marketers to match products and customers. A study of consumer behaviors, related to silk and silk products, istherefore needed, especially for entrepreneurs and relevant agencies to understand the demand side,which is continuously changing.This analysis should assist relevant agencies and policy makers to effectively expand and develop Thai silk and silk products to meet the consumer lifestyles and preferences, as well as providing suitable strategies for each consumer segment. Thus, consumer buying behavior for Thai silk productsand factors influencing theirbuying decisionsto group customers based on decision making styles were of our interested to investigate.

Consumer behavior contains the use and discarding of products and questioning how they are purchased to satisfy their needs, which has been a long-term of interest in the literature (Mohammadi and Mohamed, 2011). Furaji, Latuszynska, and Wawrzyniak, (2012) claimed that consumer buying behavior is a psychological process, which includes determining a need, searching information, evaluation of alternatives, purchase decision and evaluating their purchase. Similarly, Rani (2014) stated that consumer behavior refers to the behavior of the ultimate consumer in selection, buying and consumption of products and services for satisfying individual needs. There are varieties of factors, for example cultural, social personal and marketing mix aspects, influencing decision making. Moreover, individual preferences and behaviors differ. However, many of these factors cannot be controlled by marketers. A grasp of understanding factors, affecting end user behavior, would help firms and organizations to identify the right market segments, with effective marketing campaigns and strategies to reach their preferences and behaviors. Market segmentation involves dividing a target market into smaller clearly identifiable segments. Kolter (2000) defined market segmentation as approving and describing different purchasing groups to provide the most effective products and marketing mixes for fulfilment the needs of each group.Perreault and McCarthy (2005) stated that each group with similar characteristics will have similar responses to specific marketing mixes. Therefore, enterprises can better tailor their marketing strategies to each group more efficiently and appropriately.

Engel, Blackwell, and Miniard (1995) stated that consumer decision making models provide a number of advantages for instance: 1) the chance to understanding clearly what occurs as variables and situations change, 2) providing conceptual frameworks of reference which specify the interrelationship of variables for research purposes, 3) offering the chance to comprehend different consumer decision processes and marketing strategies, and 4) playing an critical part in the establishment of theory. Proctor and Stone (1982) claimed that the primary goal of consumer behavior analysis was to clarify why consumers act in specific ways under certain situations. Such analysis tries to identify the factors affecting consumer behavior, which can indicate the

most favored marketing mix strategies, that an organization should select. 'Marketing mix' is a set of tools for intervention in the market. Kotler and Armstrong (2010) stated that the marketing mix has four ingredients, the 4P's: product, price, promotion and place, which are the variables that marketing managers can control to effectively satisfy customer needs in the target market. Marketing mix is the mixture of different marketing decision variables, being used by the organization to influence the customer in buying goods or services (Singh, 2012).The marketing mix strategies (4P's) are linked to consumer behaviors as follows.Kotler, Armstrong, andCunningham (2005)defined *Product* as either a tangible good or an intangible service, that can be offered to a market for consideration and satisfying customer needs. It is necessary to classify and distinguish the potential buyers of the product.*Price* covers the actual amount customers are anticipated to pay for a product (Kotlerand Armstrong 2010). Price has a very significant effect on how the consumers make their decision and is the only marketing mix variable, which make profits for organization. Setting the right price for a product or service,compared to competitors, will make profit for an organization. However, customers will agree to pay a higher price if that product justifies the higher cost.*Promotion*coversthe marketing communication strategies for letting people know more about products or services. It is a key tool,for any company that can combine the various promotion components to achieve goals to persuade potential customers to buy products and services.Examples of those strategies are sales promotions, special offers,personal selling, advertisement and public relations, which should be selected for each target customer. *Place or Placement* is the process of deliveringgoods and services from producersto ultimate users. The right place

could bring a change of sales and affect profitability (Singh, 2012).

This paper focuses on applying factor and cluster analysis to segment Thai silk consumers into different clusters, according to their purchasing behaviors,responding to marketing mix strategies. Previous studies have used a variety of methods to investigate factors affecting consumer buying behavior and group those customers according to their points of view. Obviously,different scholars have explored these issues from different angles and with various methodologies for different products. Severalstudies have combinedfactor analysis and cluster analysis, a multidimensional method,in different areas of analysis. Onyango, Govindasamy, Hallman, Ho-Min, and Puduri(2004)applied cluster and factor analysis approaches to evaluation the importance of the various aspects driving Korean consumer acceptance of GM food products. Their analysis identified six core criteria affecting public opinions about the subject 1) environmental, taste and price benefits, 2) food naturalness,3)convenience or familiarity, 4)opposition to or skepticismabout biotechnology,5) open-mindedness about biotechnology and 6) discovery or optimistism about new foods. Using a non-hierarchical cluster analysis, threesectors were determined based on similarity of their views on factors driving public attitudes toward biotechnology. Azzurra and Paola (2009) surveyed 300 Italian consumers to understand consumer propensity toward a healthy lifestyle and then validate whether and how this tendency was reflected in their food purchasing and consumption behaviors, using factor and cluster analysis. The analysis of principal components synthesized 27 variables into three considered factors,i.e. healthy conscience, trust in information and satisfaction. Based on these three factors,

7762

three different groups of consumers were classified using k-means cluster method.*i.e.* 1) healthy aware, 2) disoriented and 3) not interested groups. Koutroulou andTsourgiannis (2011) surveyed 100 consumers in the Xanthi Prefecture, Greece, to identify factors affecting consumers purchasing behavior towards locally produced food through an exploratory factor analysis andfive factors were identified, *i.e.*novelty of the products, quality and health issues,appearance, freshness and taste issues and curiosity and prestige. After that, cluster analysis was used to categorize consumers, based on similarity of their buying behavior, and identified two groups of consumers:1) those that were influenced by curiosity, prestige and freshness of the product, and 2) those that were interested in the novelty of the product. In addition, Hanzaee andTeimourpour (2012)identified luxury factors from 1,097 consumers, in Iran, through an exploratory factor analysis and eight criteria were suggested. Then these factors were used for segmenting these consumers, with *k*-means clustering. They classified customers into four different behavioral styles: 1) non-luxury consumers, 2) rational consumers, 3) "social seeker" consumers and 4) materialistic consumers.Rawliman and Chu (2002) examined attitudes and behavioral patterns of young females in Hong Kong in clothing brands, by combining factors and cluster analysis.The study grouped female buying behavior into four segments, labeling them as 1) brand cognizant, 2) peer conformist, 3) style leaders and 4) value seekers.Shen, Richards, and Lin(2013) also investigated consumer awareness of sustainable fashion using the same methodologies and then three outstanding customer segments were acknowledged.Yabin and Li (2019) explored China's online wine market segmentation on the wine-related lifestyle using a Structural Equation Model. Based on the combination of Principle Component Analysis (PCA) and demographic profile of the respondents, five types of Chinese were identified. In addition, Gogoi (2020) employed attitudes of customer towards the store assortment, instore service, value added service, store environment, satisfaction level, store patronage and loyalty, to classify the customers of a retail store in India.The results from hierarchical cluster analysis classified retail customers into four different groups: 1) value seekers, 2) price conscious, 3) aspirers and 4) experiencers.

The purposes of this research were to 1)explore factors influencing consumer decisions to buy Thai silk products, and 2) segment the consumers into different clusters according to their purchasing behaviors on marketing mix strategies. It aimed to understand more the need and factors influencing the purchase of Thai silk products by consumers (B2C), while the results would suggest entrepreneurs on decision making in marketing strategies.

The rest of this paper isorganized as follows. Section 2describes research methodology. Results from the survey are then displayed in Section 3.Conclusion, discussion and recommendationsfor relevant agencies are provided in Section 4. Lastly, limitation and suggestion for further researchare also mentioned.

Research methodology

Population and sample

The population in this studywere consumers in Thailand, who were buyers or consideredbuying Thai silk products, and were of aged 18 years or more. According to Creswell (2002), the sample as a fraction of the population proportion was not accurately known and error level was set at ~5%fora 385 sample sizeswhich were sufficient for this study. In this study, a sample of 312 respondents were gathered and used to

analyze.A convenience sampling procedure was used for collecting the primary data.

Researchinstruments

This research is an empirical study in nature and used a survey method. The instruments used was a questionnaire, which had three parts:

Part 1: General information and attitudes and behaviors towards Thai silk products,including personal factors, including gender, age, occupation and current income. For attitudes and behaviors towards Thai silk products, the questions includedpopular places to buy the Thai silk products, main purposes for buying Thai silk products, important reasons driving purchasing decisions and types of silk products chosen.

Part 2: The second part was the main part of the questionnaire,included queries about marketing mixtures (Kotler,Armstrong, and Cunningham,2005),that influenced the decision for purchasing Thai silk products collected from theories and relevant researches - altogether, 35questions. Each variable used a five-point Likert-type scale(Wolfer,2007). Level 1 meant that the factor has minimal influence on decision making, whereas level 5 implied maximum influence on decision making.

Part 3: Inquiries about opinions on current issues relating to Thai silk products, in terms of products, prices, ease to reachplaces to buy and acquisition of consumer information and recommendations, which were open-ended questionnaires.

Reliability

A pilot study used 30 respondents. Conbrach's Alpha was used to test reliability of the instrument; it was equal to 0.942.This impliedthat the tool was sufficient and reliableto collect data in the full survey.

Data analysis

Data analysisusedthe Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows.We used a two-stage procedure. The first stageidentified criteria influencing consumer behaviors with respect to Thai silk and Thai silk products. Factor analysis was used to reduce35 items exploring marketing mixtures, that influenced decisionsto purchase, to a smaller and more focused set of criteria.Standardized factor scores,obtained from the first stage, were subjected to *k*-means cluster analysis in the second stageto identify clusters of respondents with similar behavior on decision-making styles.

Results

Demographic characteristics of the respondents

Most of the respondents(74%) were female,34% aged > 45, followedby 24% aged 36-45, and 23% aged 25-35. 31%were government officials or state enterprise employees, 26% in other careers and followed by 23% in private companies. Most had earnings in the range of about $US500 to $US1000 (15,001-30,000 Thai baht) per month (36%).

Consumer behaviors and attitude towards Thai silk products

For consumer behaviors, shown in Table 1, it 29%preferred to buy Thai silk or silk product from a silk trade fair, followed by 28% from a direct shop or source of production.41% intended to buy Thai silk products for their own use; but 30%did not provide the main reason for buying silk products. For buying reason, 21% stated that to support Thai products. For the types of the Thai silk products chosen by most customers, the largest fraction,

7764

32%boughtsilk fabric, followed 30% as silk   costumes.

Table 1. Consumer behaviors

Consumer Behaviors	Number	Fraction (%)
Popular places to buy silk products		
Source of silk production/direct shop	120	28.4
Silk or various clothing trade fair	90	28.9
Stores located near or in a mall	36	11.5
Others	1	0.3
Not specified	95	30.8
Main purpose for buying silk products		
For own use	128	40.9
As gifts / souvenirs	79	25.4
Residential or office décor	5	1.5
Collection	3	1.0
Others	2	0.8
Not specified	95	30.3
Main reason for purchasing silk products		
Supporting Thai products	66	21.0
Thai social value	38	12.1
Variety of beautiful forms	47	15.7
Thai silk admiration	59	18.8
Others	6	1.6
Not specified	96	30.8
Types of silk products chosen		
(more than one answer allowed)		
Silk fabric	114	32.3
Costumes of silk garments for men or women	106	30.3
Cushions/housing decorations	32	9.1
Silk-product gifts, e.g. tissue boxes, cosmetic bags, etc.	40	11.5
Scarves/ties	47	13.3
Handbags	11	3.2
Others	1	0.3

From attitudes towards silk in Table 2, the most significant characteristic of Thai silk products in view of the consumers, 47% identified that they were products representing the uniqueness of Thailand. However, as many as 37% indicated that a major disadvantage of Thai silk products was difficulty to maintain them. Furthermore, nearly three out of four respondents did not even know how to check whether it was Thai silk.

Table 2. Attitudes towards Thai silkand silkproducts

Attitudes	Number	Percentage
Most significant characteristic of Thailand's silk /silk products		
Colorful and beautiful patterns	61	19.5
Comfortable to wear	34	10.9
As unique Thai product	147	47.2
Expression of luxury/elegance when wearing or other uses	64	20.5
Others	5	1.5
Not specified	1	0.4
Major disadvantage of Thai silk /silk products		
High price	93	29.7
Difficult to maintain	117	37.3
Cost of care after use such as laundry, etc.	58	18.6
Giving older looking than one's age	35	11.2
Not comfortable to wear	6	2.2
Others	3	1.0
Knowing how to check if Thai silk		
Unknown	228	73.1
Known	79	25.4
Not specified	5	1.5

Factor Analysis

We checked whether the data collected was appropriate for factor analysis by considering the Kaiser – Meyer – Olkin (KMO) value and Bartlett's test of sphericity (Burns, 1990).Table 3 shows the KMO and the Bartlett's test values.

Table3. KMO and Bartlett's Test

Kaiser – Meyer – Olkin Measure of Sampling Adequacy (KMO)		0.911
Bartlett's Test of Sphericity	Approx. χ^2	5972
	df	630
	p-value	<0.005

From Table 3, a KMO = 0.911 showed that the existing data was appropriate for applyingfactor analysis. For the Bartlett's Test of Sphericity, which was used to test the hypothesis, $\chi^2 = 5972$ and *p-value* <0.005. Accordingly, the H_0 hypothesis wasrefuted. Confirming thatthe data collected was appropriate for factor analysis.

A Principle Component Analysis (PCA) of the extracted factors was used to determine their key factors. A varimax rotation of orthogonal axes was chosen. At the 25th factor extraction cycle, eigenvalues greater than one was shown without Factor Loading Coefficient value less than 0.3. The 35 variables were reduced into six criteria with eigenvalues greater than one, which were named as follows:

1.Ease of Shopping –eigenvalue = 6.845. Fractions of this criteria that explained all variances were at 19.013, consisting of 12 variables.

2.Product Charm – eigenvalue = 4.912. Fractions of this criteria that explained all variances were at 13.643, consisting of 13 variables.

3.Publicity – eigenvalue = 3.149. Fractions of this criteria that can explain all variances were at 8.747, consisting of 3 variables.

4.Easy Access– eigenvalue = 2.272. Percentages of this criteria that can explain all variances were at 6.310, consisting of 3 variables.

5.Product Characteristics– eigenvalue = 1.843. Percentages of this criteria that can explain all variances were at 5.120, consisting of 3 variables.

6.Sales Promotion– eigenvalue =1.087. Percentages of this criteria that can explain all variances wereat 5.120, consisting of one variable.

Details of each criteria and its component are listed in Table 4.

Table 4. Criteria and its components

Factor	Factor Loading	Mean	S.D.
1.Ease of Shopping	(eigenvalue=6.845;variance= 19.013)		
1.1 Many branches available	0.769	3.78	1.017
1.2 Good and impressive service from sales staff encouraging purchase	0.724	4.14	0.970
1.3 Products arranged in categories	0.716	3.86	0.975
1.4 Price reduction	0.697	4.11	1.075
1.5 Publicity about products or marketing activities	0.686	3.92	1.040
1.6 Ease of access	0.685	3.90	0.974
1.7 Free gift offerings	0.683	3.95	1.188
1.8 Leaflets describing Thai silk or productionof Thai Silk	0.646	3.75	1.056
1.9 Direct marketing, *e.g.* sendingmessages to clients	0.609	3.71	1.076
1.10 Publicized in magazines	0.603	3.88	1.058
1.11 Product catalogs or brochures with prices stated	0.591	3.97	1.170
1.12Organized in conjunction with agencies promoting events –One Tumbon One Product (OTOP) Expoor Tourism Authority ofThailand, etc.	0.558	4.11	1.069

7767

2.2 **Product Charm**	(eigenvalue=4.912;variance=13.643)		
2.1 Stores arranged to look good and clean	0.410	3.96	0.878
2.2 Demand for the Thai cultural conservation	0.651	4.13	0.991
2.3 Each product has clearly priced	0.648	4.07	0.876
2.4 Product diversity	0.627	3.99	0.847
2.5 Buyers willing to pay because of quality valueof theThai silk	0.618	3.95	0.868
2.6 Having range of prices based onsuitabilityand quality	0.602	4.12	0.928
2.7Buyers willing to pay if Thaisilk isfamous brand orwith accompanying legends	0.581	3.75	0.935
2.8Having passion for silk products	0.566	3.88	0.999
2.9'Care and use' document attached	0.552	3.64	1.018
2.10 Products with beautifullypatterned cloth	0.518	4.35	0.816
2.11Fabric is tight, consistently woven andseamless	0.452	4.08	0.911
2.12 Buyers willing to pay if required to use	0.429	4.04	0.894
2.13Products can be purchased at a trade show *e.g.* OTOP and Exhibition Centre of Department of Export Promotion, *etc.*	0.389	4.07	0.861
3. Publicity	(eigenvalue =3.149;variance =8.747)		
3.1 Radio broadcasting	0.816	3.31	1.296
3.2 Newspapers	0.815	3.52	1.250
3.3 Internet media	0.723	3.73	1.295
4. Easy Access	(eigenvalue=2.272;variance = 6.310)		
4.1 Products purchased through social networks	0.792	3.23	1.290
4.2 Decision regardless of the price because of satisfaction in service or shop decoration	0.639	3.39	1.061
4.2 Join important festivals of shops selling the products	0.473	3.71	0.933
5.Product Characteristics	eigenvalue = 1.843;variance =5.120)		
5.1 Natural dyeing, eco-friendly products with environmental label (EU Flower)	0.619	4.13	1.028
5.2 Product sourced from several provinces	0.451	3.73	0.987
5.3 Quality of the silk	0.391	4.43	0.757
6. Sales Promotion	(eigenvalue= 1.087; variance =3.019)		
6.1 Promotional incentive to buy	0.962	3.69	0.563

Cluster Analysis

        The six criteria resulting from the factor analysis were then taking into account as inputs in a cluster analysis to determine the classification. To group consumer intosimilar buying life styles segment,*k*-means clustering was used.Details areshown in Table 5.

Table5. Consumer behavior segments on Thai silk and silk products

Criteria	Cluster1 n=124 (39.7%)	Cluster2 n=188 (60.3%)
1.Ease of Shopping	0.00162	-0.00107
2.Product Charm	0.59224	-0.39063
3. Publicity	0.05383	0.03551
4.Easy Access	-0.76915	0.50731
5. Product Characteristics	0.05348	-0.03527
6. Sales Promotion	0.11020	-0.07268

Cluster 1: Taste-oriented Consumers: This cluster represents 39.7% of the sample. Lifestyles or consumer behaviors inthis cluster were linked to on the attractiveness, as well apassion for silk products. Those consumerswere willing to buybased on the quality of the Thai silk and famous brands accompanying legends.These customers appreciatedpromotion and characteristics of product, for instance,products sourced from several provinces and eco-friendly with an environmental label.

Cluster 2: Convenience–seeking Consumers: This cluster contained 60.3% of the sample - convenience was of major importance for them. They preferred places, that they can access easily *i.e.* decoration shops or a trade show (OTOP festival). They also liked to buy products from social networks.Additionally, they were interested inthe advertisement factor. However, they were not interested in attractiveness of the product, promotion and characteristic of product factor.

Conclusionand discussion

The present study surveyed the market factors that influence buying of Thai silk or silk products. Structured questionnaires gathered information from 312 respondents. Almost half of respondents identified Thai silk as representing the uniqueness of Thailand. Nevertheless, one-third of them indicated that major disadvantage of the Thai silk or silk products was difficulty in maintaining it. Surprisingly, nearly three out of four respondents did not even know how to check whether it was Thai silk or not. The study highlights that there is still a lack of communication between producers and marketers to provide information on cleaning Thai silk for customers. As such, many people believed that it was necessary to send silk fabrics to a laundry, that led to a high cost of maintenance. Thus the correct way to clean and maintain Thai silk, as well as how to distinguish between Thai silk and other countries' silk, should be provided and promoted generally.Accordingly, the implication for producers is that they should make available a small leaflet or brochure to provide astory of Thai silk,along with its positive characteristics, such as luster and fluidity, etc. and how to maintain products for long life.

Factor analysis showed that the key criteriafor consumers were

1) ease of buying,
2) product charm,
3) publicity,
4) easy access,
5) product characteristics and
6) sales promotion.

Entrepreneurs and agencies involved in the Thai silk product group should consider these key criteria to improve and develop the Thai silk and silk products to meet consumer needs.This study was

consistent with several previous studies, *e.g.*Limratanamongkhol and Sutamuang (2012) studied the buying decisions of hand-woven cotton of a Generation Y group in Bangkok and found that the consumers focused on standard quality of products, clean and tidy distribution places and information provision. In addition, Tangjaturasopon andJantakat (2012) found that store decoration helped attract customers to buy the products. Convenience in products buying and store decoration that should stress on the modern Thai style also influencedconsumer decisions.

Cluster analysis indicated that there were two major consumer decision-making styles in purchasing Thai silk and Thaisilk products-*"taste-oriented"* and*"convenience–seeking"*. The majority of the respondents (60.3%) were *"convenience–seeking consumers"*and were mainly concerned with easy access or convenience and publicity criteria.Onyango *et al.* (2004) investigated Korean customer acceptance of GM food and found that about half of respondents were convenience and familiarity seekers, similar to Chae, Bae, and Yoon (2008)findings. It seems that nowadays consumers are more like to buy products, which are easy to access. As a consequence, promotion and place mix strategies are very important tools to introduce products to customers. Currently,the internet has changed the way people shop (Hasslinger, Hodzic, and Opazo, 2007). Many consumers no longer spending time in a specific location and the number of internet usershas increased significantly. One could argue that consumer behaviors are changing since the internet and digital era (Oppenheim and Ward, 2006). This channel would help this group to spend time in searching products which they are really needed. The implications for retailers or producers are a logical site navigation, which will help consumers save their times in finding

products as well as focusing on customer satisfaction.

Recommendations

The following steps are recommendedtopolicy makers.

Firstly, for setting **Product Development Strategy**: it is necessary to develop new dyes to add lasting color (*i.e.* be washable) to meet the needs of a global market accompanied by innovation to reduce disadvantages of silk in laundry.Great deal of attention should focus on raw materials especially the quality of silk yarn, yarn strength, thickness and color fastness, as well as design of products in fashion or modern styles.

Secondly, for setting**Strategy for Target Market**: producers need to focus on the target market andthe target buyers, *e.g.* developing a variety of final products to suit direction of the market, *i.e.* products to suit two group of consumers, creating a silk customer base to capture a new generation market and establishing a permanent market base abroad for Thailand's silk and silk products to particularly capture the high end market, for instance. Furthermore,Thai operators should create a good reputation of Thai silk to stay in high-end market by providing regularly information, public relations and communications to importers and wholesalers abroad. At present, Thai government should promote 'Peacock' brand to communicate with customers to identify, recognize Thai silk products. Nevertheless, investment, advertising and appropriate marketing strategy are still intensely required to create any brand in the future.

Thirdly, for setting**Strategy for Distribution Channel or Coverage Strategy:** the majority of customers (represented in ~60% of the sample) are likely to buy products in a convenient channel. Therefore, the important

7770

implications for small business ownersare that they may advertise and promote products using social media;*e.g.*the 'Line application', 'Facebook' and 'YouTube videos'.Encouraging designers to create causal dresses and celerity styles using Thai silk fabric and then presenting them in YouTube videos, using'super star' models.

Thai government; for example, the Department of Commerce, is needed to pay attention on supporting producers and entrepreneurs to promote theirhandicrafts products withtraditional stories, via electronic channels and social media. Furthermore, the Department of InternationalTrade Promotion and the Department of Commerce should also provide exhibitions, international silk festival and permanent showrooms for small business owners to take turn in displaying and distributinghandmade products regularly, both locally and throughout the world, so that consumers will reach the producer groups. Furthermore,policy implications should be paid attention on how to promote Thailand to be a hub of silk culture exchange and trading in the ASEAN countries.

Finally, for setting **Value-added Strategy:** the value of Thai silk can be increased by offering Thai silk products to niche markets, with precise features, *e.g.* "Thai origin brand" or "Organic silk". The story explaining why products differ from others and how to produce typical fabrics or produces in a traditional approach by people in countryside areas of Thailand should be provided for specific customers. In addition, information about the 'organic silk' should be provide in a small leaflet, explaining for example that the dye color is ecologically friendly and there is no chemical remainder left in the fabric, and so on (Canavari, 2011). It should be noted that good design, product innovation and quality could facilitate distinction between Thai silk products,

which can launch consumer, trust loyalty, which will allow products to command a premium price. However, producers need to understand what they can produce, as well as what customers need. Moreover, producers should be encouraged to create different styles of final products, *e.g.* scarves, hand bags, pillows, shirts, blouses, as well as gift sets of Thai silk products, in a modern style.

Limitation and suggestion for further research

Whilst this research identified criteria influencing consumer decisions to buy Thai silk products and classify consumer purchase behaviors into two segments, there are some limitations that may suggest directions for future investigation. Future studies should be extended to foreign consumer attitudes and behaviors and may also cover online shoppingbehavior on silk products.Consequently, the study could be replicated in the Generation X and C markets to compare their shopping behaviors in order to provide the right products to right customers. This study did not combine factors affecting consumer decision with demographic characteristics, *e.g.* gender and income into classification model. These characteristics may result in different shopping behaviors. Hence, further analysis using two-step clustering algorithm, which can take into account both continuous factors affecting purchase decisions and categorical variables,*i.e.* demographic information of customers, *e.g.* different generations, regions or income levels,is recommended.This will provide further understanding of the consumer behavior. Additionally, further understanding may be achieved by taking into consideration the causal relationships between the segmentation criteria and actual or perceived attitudes towards Thai silk products.

Acknowledgements

References

Anonymous. (2014). History of Thai silk. Retrieved from http://thaiphamai.blogspot.com/(in Thai). Accessed on June 8, 2020.

Azzurra,A.,and Paola, P.(2009). Consumers' behaviours and attitudes toward healthy food products: The case of Organic and Functional foods. Paper presented at the113th EAAE Seminar, Chania, Crete, Greece.

Burns, R. (1990).*Introduction to Research Methods*. Melbourne: Longman Chesire.

Canavari, M., Wongprawmas, R., Tomasin, G., Hingley, M. and Galanti, G., (2011). *The perception of European operators toward Thai natural and organic silk fabric and final products.Retrievedfrom http://script-thai.eu/wp-content/uploads/2011/04/Silk-Study-in-EU-2011-SCRIPT -Project.pdf. Accessed on November 22, 2020*.

Chae M.J., Bae, H.J.,andYoon,J.Y. (2008).Consumption practices and selection attributes of the university students on ready-to-eat foods. *Korean Journal of Food Service Management,11*,289–307.

Creswell, J.W. (2002). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*(2nd ed.). California: SAGE Publications, Inc.

Engel, J. F., Blackwell, R. D., and Miniard, P. W. (1995). *Consumer behavior* (7th ed.). Orlando, Florida: The Dryden Press.

Furaji, F., Latuszynska, M.,and Wawrzyniak, A. (2012). An Empirical Study of the Factors influencing Consumer Behaviour in the Electric Appliances Market. *Contemporary Economics, 6*(3),76–86. doi: 10.5709/ce.1897-9254.52

Gogoi, B. J. (2020). Changing Consumer Behavior: Segmenting Consumers to Understand them Better. *International Journal of Management, 11* (5), 341–350.

Hanzaee, K.H.,andTeimourpour, B.(2012). Segmenting Consumers Based on Luxury Value Perceptions. *Middle-East Journal of Scientific Research, 12* (11), 1445–1453.

Hasslinger, A., Hodzic, S., and Opazo, C.(2007). *Consumer Behaviour in Online Shopping.*Department of Business Studies. Kristianstad University.

Hoonwongsa, A. (2017). Thai Silk Career Group Promotion. *Journal of Research and Development. Institute, Rajabhat Maha Sarakham University, 4*(1), 53–64 (in Thai).

Kolter, P. H. (2000). *Market Management: Analysis, Planning, and Control.* London: Prentice Hall.

Kotler, P.,Armstrong, G.,and Cunningham, M.H. (2005). *Principle of Marketing* (4th ed.).Harlow, Essex, UK: Pearson Education Limited.

Kotler, P.,and Armstrong, G. (2010). *Principles of Marketing* (13th ed.). New Jersey: Pearson Education Inc.

Koutroulou, A.,andTsourgiannis, L. (2011). Factors affecting consumers' purchasing behavior towards local foods in Greece: the case of the prefecture of Xanthi. *Scientific Bulletin-Economic Sciences, 10* (16/2), 1–14.

Limratanamongkhol, P.,andSutamuang, K. (2012).Decision of Purchasing Hand Woven Cotton of Generation Y in Bangkok Area.*Journal of Finance, Investment, Marketing and Business Management, 3*, 337–354.

Mohammadi, A.M.,and Mohamed, B. (2011). Applying Consumer Behaviour Theory and Grand Models to Attendees Behaviour in Conference Industry. *Tourism & Management Studies, 1,* 151–159.

Thai Silk: A Buyer's Guide. (2016). *Retrieved from https://mythailand.blog/2016/05/24/thai-silk-thailand/. Accessed on October 16, 2020.*

Onyango, B., Govindasamy, R., Hallman,W., Ho-Min Jang, H., and Puduri, V.S.(2004). *Consumer Acceptance of Genetically Modified Foods in Korea: Factor and Cluster Analysis.*Working PaperNo.WP1104-015. Joint 2004 Northeast Agricultural and Resource Economics Association and Canadian Agricultural Economics Society Annual Meeting, Canada, WI.

Oppenheim,C.,& Ward, L. (2006).Evaluation of web sites for B2C e-commerce. *Aslib Proceeding:New Information Perspectives, 58*(3), 237–260.

Perreault, W, and McCarthy, E. J. (2005). *Essentials of Marketing.* New York: McGraw Hill.

Proctor, R.,& Stone, M. A. (1982). *Marketing Research.* Great Britain: Macdonald and Evans Ltd.

Rani, P. (2014). Factors influencing consumer behavior. *International Journal of Current Research Academic Review, 2*(9),52–61.

Rawliman,S.,and Chu,W.(2002).The Examination of Attitudes and Behavioral Patterns of Hong Kong Female Youth in Clothing Brands. *Research Journal of Textile and Apparel, 6*(1), 91–100.

Shen,D., Richards, J.,and Lin, F.(2013). Consumers: Awareness of Sustainable Fashion. *Marketing Management Journal, 23*(2),134–147.

Singh, M. (2012). Marketing Mix of 4P'S for Competitive Advantage. *Journal of Business and Management, 3*(6), 40–45.

Tangjaturasopon, A.,and Jantakat, C.(2012).Customers Buying Behaviors of Nakhornchaiburin Silk.*Proceedings of50th Kasertsart University Conference,* Bangkok, Thailand. (pp. 240–247).

The Nation. (2019). *Thai silk cashes in on increasing demand from affluent markets.* Retrieved from https://www.nationthailand.com/business/30372817. Accessed December 16, 2020.

Wolfer, L.(2007).*Real Research: Conducting and Evaluating Research in the Social Sciences.*Boston: Pearson/Allyn and Bacon.

Yabin, W.,and Li, J. (2019). Segmentation of China's online wine market based on the wine-related lifestyle. *British Food Journal.*Doi:10.1108/BFJ-04-2019-0295.