EFFECT OF CUSTOMER NEED TO SCREEN PRINTING INK PRODUCTION USING RUBBER-BASED RESINS FOR FABRIC PRINTING

[1]Weera Chotithammaporn

[1] Suan Sunandha Rajabhat University. Email: weera.ch@ssru.ac.th

ABSTRACT

The focus of this paper is to examine the impact of customer need knowledge for advanced screen printing on enhancing the sales volume of a fabric printing company in the Thailand market. To justify this point, online survey-based quantitative research is conducted. Its SEM and moderating analysis based statistical outcomes show that there is a significant relationship between the customer need knowledge for screen printing and the sales volume of screen volume by considering a significant mediating role of customer relational value between them. Well, the market-oriented strategies play a significant moderating role in this mechanism. Overall, it's an informative approach for Thai Fabric Printing firms and their management to consider the importance of customer knowledge in their screen printing process. Well, it's a lack of mixed research-based comparative analysis approach within this paper that can be utilized by future researches.

1.　　Introduction

Screen printing is such a printing technique in which a mesh is specifically used to transfer the ink onto the substrate by using a blocking stencil. Its mesh can be made with a synthetic polymer like finer and nylon where the smaller apparatus for mesh would be utilized for such designs that requires a more delicate and higher degree of details (Somalu, Muchtar, Daud, & Brandon, 2017; Zhang, Wei, Huang, & Long, 2016). This process is considered as the major designing portion within a fabric printing industry that directly impact on the sales revenue of a company because it an important source to fulfill the desires of the targeted customers (Hoeng, Denneulin, Reverdy-Bruas, Krosnicki, & Bras, 2017; Pan et al., 2018). In Thailand, many fabric printing companies are operating, and this state ranked as 9th largest producer of polyesters and 5th largest producers of acrylics all over the world. Annually, Thailand produces around 900,000 tons of synthetic fibers, where both domestic production of man-made and local consumption fibers are continuously growing on yearly basis ("Textile Industry," 2020). Textile Mills of Thailand are specialized, modernized and manufacture a variety of fabrics that are exported to many countries, as mentioned below;
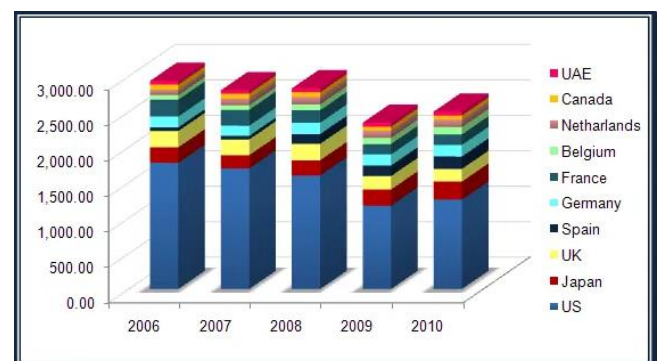

Figure 1: Apparel Exports from Thailand

This shows that the maximum number of this industry fabrics are exported to the developed nations of the globe and earn a maximum profit ("Thailand gets highlighted in the global textile &amp apparel segment," 2020). Also, there was a drastic change shown in the textile and apparel export of different states from 2017 to 2018 that resulted in maximum export growth of Thailand, US, Turkey, Japan, Cambodia and Vietnam ("Strategic Advancement of South Korean Textile

and Apparel Industry," 2019), as shown in the following table;

Country	Change In Textile and Apparel Exports
Thailand	7%
Cambodia	6%
Philippines	-2%
Hong Kong	-11%
Turkey	12%
Indonesia	3.7%
Japan	5%
US	11.5%
China	-1.5%
Vietnam	4%

Table 1: Change In Textile and Apparel Exports From 2017 to 2018, By Countries

The Problem statement of this paper is to critically evaluate the influence of customer need knowledge for screen printing on enhancing the sales volume of a fabric printing firm by creating a strong customer relationship within a market. This research statement is an attractive approach to give a new direction to the fabric printing organization to develop such a market-oriented strategy that will help their Thai customers to remain loyal with the brand.

This paper is the justifiable and challenging research paper which significantly covers the gap of the previous researches that only worked on considering the therapeutic screen printing ink for apparel, considering the wearable electronics and small textiles, and studying the 3D printing polymers and their customized additive manufacturing based related topics (Falken, 2016; Ghahremani Honarvar & Latifi, 2017; Harianja & Fibriasari, 2019; He, 2019; Hertati & Safkaur, 2019; Houndjo, 2018; Hu et al., 2018; Huang & Lee, 2018; Hussain, Ahmad, Qamar, & Akram, 2019; Ligon, Liska, Stampfl, Gurr, & Mülhaupt, 2017). But nobody majorly considered the Thai customer needs and their desires on the fabric printing mechanism which is majorly studied

within this paper. The major objectives of this research are mentioned below;

- To critically evaluate the influence of customer need knowledge for screen printing on the sales volume of the fabric printing company in Thailand market.
- To critically evaluate the importance of customer relationship value between customer need knowledge and the sale volume of a fabric printing company in Thailand market.
- To critically inspect the importance of market orientation to strengthen the impact of customer relationship value on the sales volume of the Thai fabric printing Industry.

This is informative and attractive research for the national fabric printing companies within the Thailand market to understand how the customer needs and desires, regarding the screen printing ink production, cause a major impact on their profit margin. This paper will help this industry management to develop such strategies that fulfill the needs of the targeted customer and gain a competitive advantage. This data will also help the local consumers to understand their influence on the company's production and sales revenue. Also, the related field scholars can utilize this valid information in their discussion portion.

2.   Literature Review
2.1   *Customer Service Theory*
In the field of business, "keep customers happy" is such an aim which is at the top list of any product and service providing company. In this case, the customer service theory is considered as the most important and attractive theoretical approach to manage a large number of diverse customers at the same time (Khatoon, 2020; Kimura, 2017). This theory based on reducing the warranty and returns claims, decrease the negative experience of users, build a loyal customer base, improve the sales process for customers, and enhanced the customers' satisfaction (Hankammer, Brenk, Fabry, Nordemann, & Piller, 2019). According to the business analysts, whenever this theoretical

approach is implemented in the operating activities of a company, it results in enhancing the speed of company's growth in the market, makes everything more transparent; and promote the concept of friendliness, simplicity, availability, accuracy, accessibility and empowerment in the mind of customers (Ihtiyaroglu, 2019; Inam & Etim, 2020; Izgar, 2019; Krishnamoorthi & Mathew, 2018; McDonald & Wilson, 2016). They utilized this theory in order examine the customer service perception, companies performance, brand image and their future growth in the diverse customer and competitive market (Piccoli, Lui, & Grün, 2017; Puutio, 2019; Rahi, Ghani, & Ngah, 2020; Yom-Tov et al., 2018).

2.2 Customer Need Knowledge for Screen Printing and Sales Volume of Screen Printing

To explore the importance of customer preferences on the sales volume of the screen printing oriented company, research was conducted by Tuhkala and others (2019). According to them, being a firm manager it is his major responsibility to consider the needs and desires of the customer in their screen printing method by providing practical guidelines for the multiplayer printing guidelines related to processing parameters and top screen printing process etc (Naveed, Hameed, Albassami, & Moshfegyan, 2019; Tuhkala, Tuomaala, & Määttä, 2019). Also, Laurent Scaringella with others stated that customers can easily facilitate or hinder a quest of a firm for the radical innovation where the absorptive capacity of a firm plays a major role to internalize the customers' knowledge. They concluded that spin-offs need a blending capability to successfully develop a radical innovation in customer-oriented products. They justified that an efficient absorptive capacity is crucial for the technological spin-off of a company's operation (Scaringella, Miles, & Truong, 2017). In the same year, critical research was conducted by Wang where he stated that the increased competition in the consumer market pressurized the company's management to directly ponder on fulfilling the needs and desires of the targeted audience at the reasonable prices and also make some efficient

changes in the screen printing process that directly fulfill the customer's desires (M. Wang, 2017). After critically evaluating the previous researches' work, the hypothesis has been proposed;

H1: There is a significant relationship between Customer Need Knowledge for Screen Printing and Sales Volume of Screen Printing

2.3 Mediating Role of Customer Relational value for Screen Printing between Customer Need Knowledge for Screen Printing and Sales Volume of Screen Printing

In the journal of Modern Craft, Chamithri Greru and Britta Kalkreuter (2017) majorly worked on evaluating the designing and the evolution of the traditional Sanganar Hand Block Printing that directly fulfills the need of the target audience. In their informative research, they stated that transformative process has been reinvented, enforced, contested, or denied with the heritage seen. They also justified the role of design and craft interaction in rejuvenating and safeguarding a cultural practice to receive massive customer attention towards their operating activities. They concluded that if the customers' preferences are added in the transformation and cultural provoking ideas in the block printing, then there will be more chances to promote the long-term relationship between the company and its customers (Greru & Kalkreuter, 2017). In 2019, the related scholars majorly worked on designing the perceptions for the 3D printed accessories of the digital devices that result in enhancing the customer-based brand equity of a company. According to these researchers, there is a direct impact of such 3D printed accessories and the brand equity of a customer where the experimental value act as a significant mediator. They concluded that customer perception towards the company's products and services oriented innovation plays a significant role in motivating them to utilize the company's items and remain loyal to that brand. This shows that such customer relationship value plays a pioneering role in the long term sustainability of a company (Meng & Bari, 2019). Well, the others also stated that the customer preference

segmentation significantly plays a major role in developing the digital loyalty program because in the heterogeneous market, the affluence, age, gender and the number of psychological understanding of customers play a major role in developing some innovation projects within a customer market (Ieva & Ziliani, 2017). Hence, the following hypothesis has been suggested;

H2: There is a significant mediating role of Customer Relational value for Screen Printing between Customer Need Knowledge for Screen Printing and Sales Volume of Screen Printing

2.4 Moderating Role of Market Orientation of Screen Printing Firms between Customer Relational value for Screen Printing and Sales Volume of Screen Printing

In 2019, Arisona, Taufik, & Irwanto stated that there is a direct relationship between the service quality, location and price on customer loyalty within a company's operation. They stated that screen printing service is specifically considered the consumers' preferences in their final product that cause major changes in the sales revenue portion. According to them, an efficient service quality, its location, and price cause a major impact on the customer loyalty towards the company's operating activities; and in this case, if the management worked on the customer-oriented strategic approaches then more desirable outcomes will be generated (Arisona, Taufik, & Irwanto, 2019). In the same year, Sarah Mussol and her research partners critically evaluate the importance

of in-store brand strategies and their relationship expression in enhancing the sales promotion of a company. According to them, non-monetary promotions directly generates a more relational benefit as compared to the price based promotions because they directly deal with the psyche of the end-users. After critically evaluate the statistical outcomes, they concluded that attractive sales promotion directly conveys the brand's willingness to significantly developed in-store encounters and result in enhancing the customer-brand relationship in the long run (Mussol, Aurier, & de Lanauze, 2019). Well, in 2020, the related field researchers also evaluate the efficient customer relationship management by stating that if mobile-based printing services are implemented on the cross-selling and up-selling strategies then it directly increased the printing sales. It is because if the management worked on the needs and desires of their printing mechanism then it results increase the number of transactions by 31% which will be 21-40% more than the traditional printing style (IBRAHIM et al., 2020). After critically consider these above research articles, the following hypothesis has been proposed;

H3: There is a significant moderating role of Market Orientation of Screen Printing Firms between Customer Relational value for Screen Printing and Sales Volume of Screen Printing
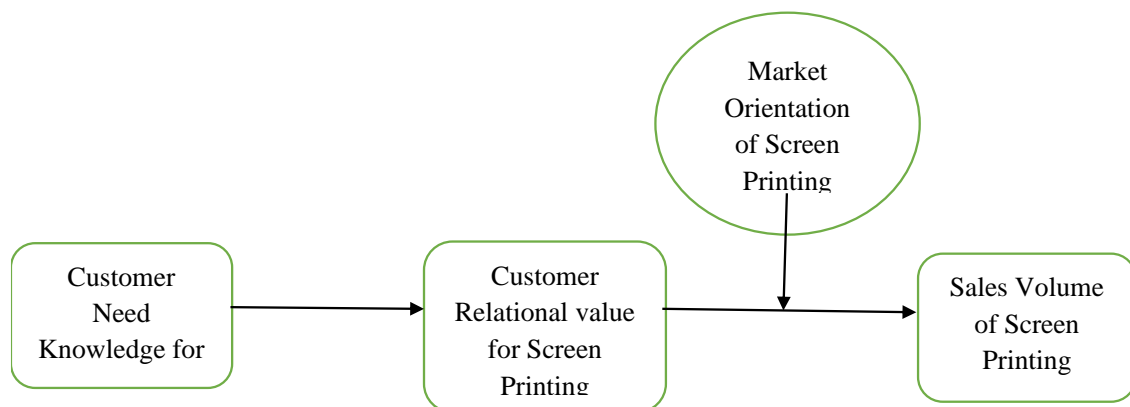
2.5 Theoretical Framework

Figure 2: Theoretical Framework

3.   Research Methodology

In this paper, a quantitative research method is used for the relevant data collection mechanism (Ball, 2019; Evans & Mathur, 2018), where Customer Need Knowledge for Screen Printing is act as an independent variable, Customer Relational value for Screen Printing as a mediator, Sales Volume of Screen Printing as a dependent variable and Market Orientation of Screen Printing Firms as a moderator is considered in this data collection based questionnaire. For data collection, the close-ended questions based online survey was conducted to the related field employees, experts and management team of the fabric printing companies in Thailand. In this appropriate data collection measurement, a five-point Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree) was used that helps to categorize the respondent outcomes. The randomly online 350 questionnaires were distributed to the above-mentioned respondents.

In the survey results, only 289 of them gave valid outcome where 156 (54%) are males and 133 (46%) are females. In the age demographic, 88 active respondents (30.4%) are less than 25 years, 122 (42.2%) are between 25 to 35 years, 66 (22.8%) are between 35 to 45 years and 13 (4.5%)

are more than 45 years. As far as their experience based demographic analysis is concerned, it becomes concluded that there are 44 participants (15.2%) who have less than 2 years of experience, while 125 (43.3%) have 2 to 5 years of experience, 92 (31.8%) have 5 to 8 years of experience and 28 (9.7%) have more than 8 years of experience.

To make an authentic statistical analysis to justify or nullify the hypothesis, the SPSS software-based tests and models are implemented, named as structural equation modeling (SEM), Kaiser-Meyer-Olkin (KMO) and Bartlett's test, confirmatory factor analysis (CFA) and moderating analysis.

4.   Results and Analysis

The SEM model is used to take the statistical analysis of the given variables concerning their hypothesis. The KMO test is used to explore the adequacy of the sample. The CFA figure is used to show the correlation of the variables in the formed mesh. Well, its Moderating analysis plays a significant role to understand the influence of outside variables on strengthening the relationship between the tested variables (Jak & Cheung, 2019; Wong, 2016). For the data analysis, the first model is the descriptive statistics, as mentioned below;

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
CNKFSP	289	1.00	5.00	3.3997	1.06713	-.422	.143
CRFSP	289	1.00	5.00	3.4204	1.01151	-.495	.143
MOSPF	289	1.00	5.00	3.6094	1.19250	-.662	.143
SVSP	289	1.00	5.00	3.3057	1.14531	-.399	.143
Valid N (listwise)	289						

Table 2: Descriptive Statistics

In the above-quoted table, it becomes clear that customer relational value and the customer need knowledge for the screen printing is highly deviated from its mean position. It becomes these factors cause a major impact on the dependent

variable. While on the other hand, the sales volume and the market-orientated oriented statistical values highly deviate from their mean position that is helpful once to make desirable outcomes.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.871
Bartlett's Test of Sphericity	Approx. Chi-Square	3396.637
	df	66
	Sig.	.000

Table 3: KMO and Bartlett's Test

According to the above statistics, it becomes clear that all the Kaiser-Meyer-Olkin measures are within their threshold range with an appropriate significance and difference level, which means this model is a good fit to test the hypothesis of this study. After this, the rotated component matrix-based outcomes are mentioned below;

	Component			
	1	2	3	4
CN1			.824	
CN2			.909	
CN3			.853	
CR1		.878		
CR2		.867		
CR3		.850		
MO1	.913			
MO2	.918			
MO3	.903			
SV1				.822
SV2				.864
SV3				.858

Table 4: Rotated Component Matrixa

Well, the above table depicts that all the items' value of the rotated component matrix is more than 0.7 (standard value) and within the threshold range, it means all the items are effectively uploaded on the tested model and no more confusion remains in its uploading process.

	CR	AVE	MSV	MaxR(H)	MO	CN	CR	SV
MO	0.915	0.855	0.298	0.988	0.977			
CN	0.908	0.767	0.308	0.989	0.492	0.876		
CR	0.911	0.774	0.308	0.990	0.470	0.555	0.880	
SV	0.873	0.696	0.298	0.991	0.546	0.394	0.567	0.843

Table 5: Convergent and Discriminant Validity

According to the above convergent and discriminant validity based statistical outcomes, the average variance extracted values of each tested item is more than 0.5, and all the composite reliability values are also higher than 0.7. It means there is no occurrence of any convergent validity issue within this mechanism. Also, the bold letters based outcomes depict the non-occurrence of discriminant validity issues on the tested variables. The reason is that each item has its own identity and different from the other ones.

CFA Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	1.318	0.966	0.996	0.995	0.033

Table 6: Model Fit Indices

The above informative table shows that all the CFA indicators' values (CMIN/DF, GFI, IFI, CFI and RMSEA) are within their threshold range. Like the RMSEA observed value is 0.033 (lower than 0.08), both outcomes of IFI and CFI are somehow similar with 0.10 (greater than 0.90), the GFI value is 0.966 (greater than 0.80), and the CMIN/DF value is 1.318 (lower than 3), as shown in the following figure;
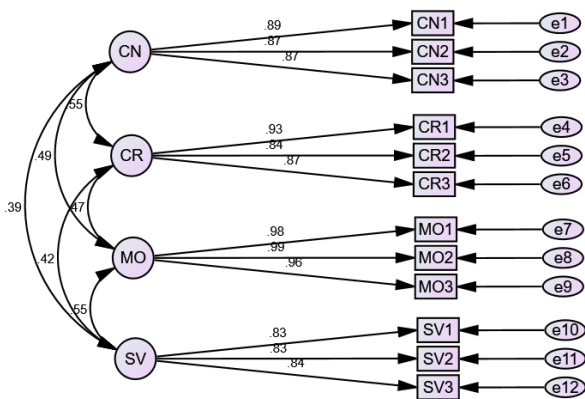

Figure3: CFA

Total Effect	CNKFSP	CRFSP
CRFSP	.517**	.000
SVSP	.379**	.264**
Direct Effect	CNKFSP	CRFSP
CRFSP	.517**	.000
SVSP	.243**	.264**
Indirect Effect	CNKFSP	CRFSP
CRFSP	.000	.000
SVSP	.136**	.000

Table 7: Structural Equation Modeling

The above SEM table shows that there is a significant relationship between the tested variables like one percent deviation in the customer need knowledge for the screen printing cause 52% customer relational value for the screen printing and 38% in the sales value of screen printing. While the mediating role of customer relational value causes 26.4% deviation in the dependent variable (Hameed, Basheer, Iqbal, Anwar, & Ahmad, 2018; Ul-Hameed, Mohammad, & Shahar, 2018). Its graphical representation is given below;
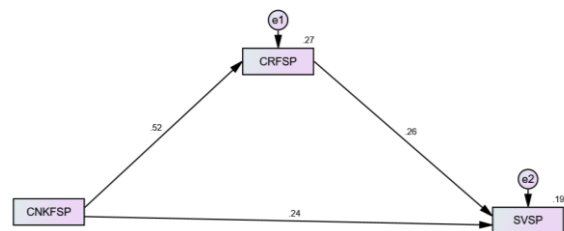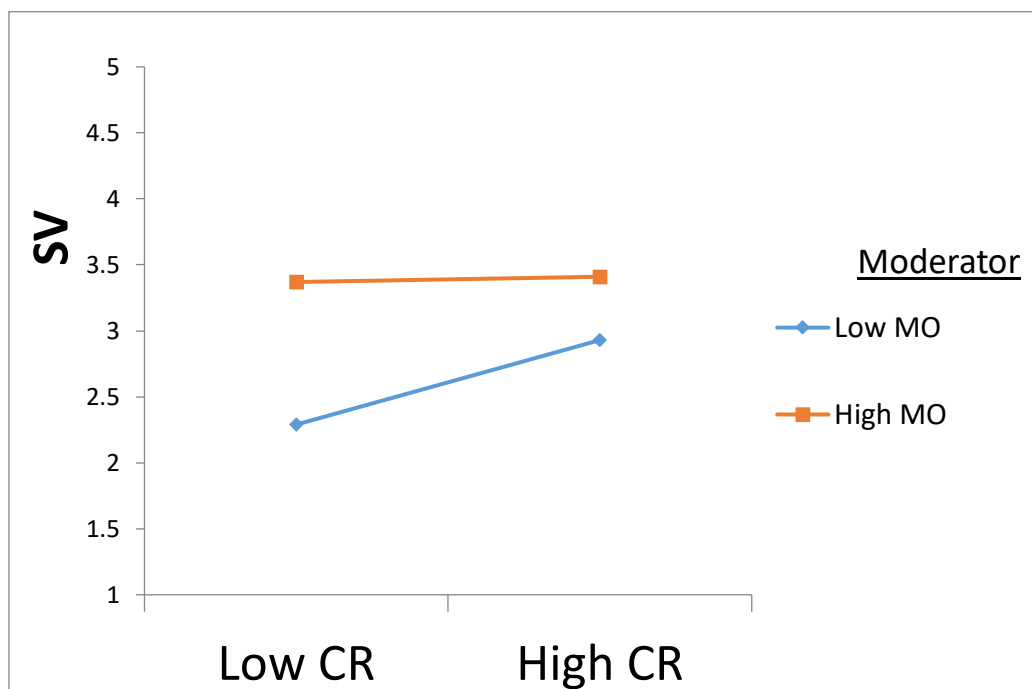

Figure 4: SEM

Figure 5: Moderating Analysis

Well, the above moderating analysis based outcome shows that there is a significant influence of the marketing orientation for the screen printing at the maximum point of both customer relational value and the sales volume of a company.

5.   Discussion and Conclusion

5.1   Discussion

The statistical outcome depicts that there is a productive influence of the customer knowledge on enhancing the sales volume of the screen printing process of a company. This point was also justified by Yi Wang and others in their research article. According to them, advanced IT directly impacts the innovation performance of the company because it is an effective way to fulfill the needs and desires of the targeted audience within a market and gain a competitive advantage (Y. Wang et al., 2013). Also, in the Journal of Hospitality and Tourism, the researchers stated that the customer need knowledge among the employees directly enhanced their company's value creation in the consumer market. According to them, the better service performance of a company is majorly dependent on the advanced and interactive relationship between the customer and employees; and in this case, the frontline manager plays a major role (Xie, Guan, & Huan, 2019).

5.2   Conclusion

Thus, it becomes concluded that there is a significant impact of customer need knowledge on the enhancement of sales volume of the screen printing within a textile industry of Thailand, where the customer relational value plays a major role in creating a healthy and loyalty provoking relationship between the company's management and the customers. Well, according to the moderating analysis based outcomes, the excessive market orientation based strategies approach plays a significant role to develop such strategies within a company that directly hit the customer's desires.

5.3   Future Implication

This will be productive research for the Thai textile industry and its management team to develop such screen printing that directly fulfills the customer needs and desires which may result in the enhancement of their profit margin. Also, the paper can be utilized by Thai textile users to understand their responsibility towards innovation. Well, this valid data can be utilized by related field scholars.

5.4   Limitations and Future Researches

There is a lack of a mixed method of informative research and also a deficiency of comparative analysis is seen within its analysis portion, which can be overcome by the upcoming researches.

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