IDENTIFYING THE ASSOCIATION BETWEEN SUPPLY CHAIN INTEGRATION AND SUPPLY CHAIN PERFORMANCE ON COMPETITIVE ADVANTAGE AMONG TAILORING SHOPS IN THAILAND

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ABSTRACT

This research paper aims to study 'The relationship of Supply Chain Integration (SCI) towards Supply Chain Performance (SCP) and the direct relationship between Supply Chain Performance (SCP) and Competitive Advantage (CA) among small enterprises (SE). The researcher identified the managers of tailoring shops operating in Bangkok, Hua Hin and Pattaya in Thailand as the target sample for this research study. The research was carried out during 2019 on a convenience sample of 410 respondents with data collected using structured questionnaires. Reliability of the questionnaire was tested using Cronbach's Alpha test. The interrelationships proposed in the framework were tested using Structural Equation Modeling (SEM). The results showed that there is a significant positive relationship between SCI and SCP. Similarly, SCP statistically influenced CA.

Keywords: *Supply Chain Integration (SCI), Supply Chain Performance (SCP), Competitive Advantage (CA), Structural Equations Modeling (SEM).*

บทคัดย่อ

งานวิจัยฉบับนี้มีวัตถุประสงค์ที่จะศึกษาถึงความสัมพันธ์ของการบูรณาการในโซ่อุปทานที่มีผลต่อสมรรถนะทางโซ่อุปทาน และความสัมพันธ์ทางตรงระหว่างสมรรถนะทางโซ่อุปทานและความได้เปรียบทางการแข่งขันในกลุ่มขององค์กรขนาดเล็ก ทั้งนี้ผู้วิจัยได้เลือกผู้จัดการของร้านตัดเสื้อที่ตั้งอยู่ในกรุงเทพฯ หัวหิน และพัทยา เป็นกลุ่มตัวอย่างในการทำวิจัยในปี 2019 โดยการสุ่มตัวอย่างตามความสะดวก และเก็บแบบสอบถามได้ทั้งหมด 410 ร้านค้า การเก็บข้อมูลโดยการใช้แบบสอบถามที่มีโครงสร้าง หลังจากนั้นผู้วิจัยได้ทำการการทดสอบความน่าเชื่อถือของแบบสอบถามโดยใช้การทดสอบค่า Cronbach's Alpha ส่วนความสัมพันธ์ของตัวแปรต่าง ๆ ตามกรอบ ได้ทดสอบทางสถิติโดยใช้ Structural Equation Modeling (SEM) ผลการทดสอบแสดงให้เห็นถึงความสัมพันธ์ระหว่างการบูรณาการในโซ่อุปทานและสมรรถนะทางโซ่อุปทาน และสมรรถนะทางโซ่อุปทานที่มีอิทธิพลในทางสถิติต่อความได้เปรียบทางการแข่งขัน

คำสำคัญ: การบูรณาการในโซ่อุปทาน สมรรถนะทางโซ่อุปทาน ความได้เปรียบทางการแข่งขัน

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INTRODUCTION

After analyzing the previous empirical studies, Bagchi, Chun Ha, Skjoett- Larsen and Soerensen (2005) observed that "the conventional wisdom in most of the Supply Chain Management literature is that more integration leads to better performance of the supply chain". Majority of the existing studies have found the existence of a significant positive relationship between Supply Chain Integration (SCI) and Supply Chain Performance (SCP) (Frohlich, & Westbrook, 2001; Lee, & Billington, 1993; Sezen, 2008).

On the other hand, there are some researchers who did not find any statistically significant positive relationship between the two variables (Bagchi et al., 2005; Das, Narasimhan & Talluri, 2006; Gimenez, van der Vaart, & van Donk, 2012). Bagchi et al. (2005) suggested supplier integration over time might lead to complacency as the supply chain partners might take each other for granted. Furthermore, according to the results of their study, the authors also noted that another reason for negative correlation between long term Supplier Integration and SCP can be because companies might find it difficult to disseminate from the long term suppliers and hence limits itself from following new information and innovation in the market place (Bagchi et al., 2005).

Liu (2011) found a significant positive relationship between SCP and CA among manufacturing firms in China. On the other hand, in their empirical study on the wood clusters in Croatia, Zekip and Samarzija (2017), did not find any significant positive relationship between SCP and CA. However, Christopher (2005) noted that companies are increasingly prioritizing on improving their overall Supply Chain Performance (SCP) in order to achieve Competitive Advantage.

Based on the above cited studies and some of the associated contradictory results, the researcher observed that it is critical to statistically test whether there is a positive relationship between SCI, SCP and CA, especially in the context of small enterprises.

This research study aims to contribute to the existing body of knowledge in Supply Chain academic literature by exploring the causal relationship among SCI and SCP. It also shows the empirical efforts which were initiated to explore the relationship between SCP and CA among supply chain partners in the context of tailoring shops in Thailand.

This research has significant implications for practitioners. Visara and Hunt (2008) noted that SMEs in Thailand generally lack adequate knowledge to evaluate their own Supply Chain Performance. This shortfall also leads to low Competitive Advantages when compared to larger firms (Rungwitto, 2008; Visara & Hunt, 2008). The researcher believes that this thesis research study will at least act as a basis for some of the retail managers/ owners to take time to reflect and evaluate their Supply Chain Performance. This self evaluation as well as the findings of this study might help them to identify Competitive Advantages with respect to cost reduction and / or value addition to their product and/ or service offerings.

LITERATURE REVIEW

The researcher aims to present an overview of the related literature which was researched upon for collecting secondary information for this study.

Supply Chain Integration (SCI)

Flynn, Huo and Zhao (2010) define SCI as the strategic collaboration which a manufacturing firm seeks from its supply chain partners. According to Arora, Saxen and Sivakumar (2016) there are three basic types of SCI. They are 'internal integration', 'external supplier integration' and 'external customer integration'. These classifications are based on the direction and general boundaries of integration.

If internal integration is confined within an organization's internal boundaries, external integration is a much wider concept and covers various supply chain partners (Rodrigues, Stank & Lynch, 2011; Wolf, 2011). Wolf (2011) defines 'external integration' as integration at the interface of different organizations in a supply chain. External integration can be further categorized as Supplier Integration (SUI) and Customer Integration (CUI). Some authors have studied both SUI and CUI in SCI. While majority of the researchers covered only SUI (Das et al., 2006; Fynes, Voss & de Bu´rca, 2005; Scannell, Vickery & Droge 2000; Wagner, 2003). The rest were researches which studied only customer integration (Kulp, Lee & Ofek, 2004).

This thesis research study takes into consideration only 'external upstream integration' with immediate suppliers and 'external downstream integration' with immediate customers. The researcher chooses not to include 'internal integration' dimension of SCI.

SCI is especially important for small enterprises operating in a wider supply chain. Karaev, Koh and Szamosi (2007) highlighted that due to its limitations with respect to size and resources, small enterprises as well as medium size enterprises increasingly tend to focus on building well founded and mutually advantageous relationships with supply chain partners. These enterprises understand the importance of entering into strategic relationships with their partners in supply chain and leveraging on each other's different capabilities to develop advantages on a competitive nature in the market place.

Supply Chain Performance (SCP)

SCP is defined as the overall efficiency and effectiveness of the supply chain (Beamon 1998). According to Neely, Gregoy and Platts (1995) SCP is also defined in literature as the process of quantifying effectiveness and efficiency of various actions in Supply Chains.

After reviewing many previous researches related to choosing performance measures for various systems including supply chain, Beamon (1999) observed that the general approach used in majority of these researches were to characterize many similar performance measures into fewer categories. The researchers then considered the measure in one of these different categories.

Cost, customer responsiveness, and activity time were some of the general performance measures used in the earlier studies (Beamon, 1998; Pyke & Cohen, 1994). Neely et al. (1995) identified quality, flexibility, cost and time as some of the most important performance measures.

For instance, if the chosen performance measure is 'time', the objective might be to improve lead time or due date performance (Beamon, 1999).

Beamon (1999) also proposed (1) Universality; (2) Consistency; (3) Measurability; and (4) Inclusiveness as the main characteristics for selecting effective performance measurement systems. Beamon (1999) recommends three separate types of performance measures:

1) **Resource measure**

Beamon (1999) stated that the purpose of categorizing various variables under 'resource' performance measure is because of the observation that efficient resource management is critical to profitability. The various Supply Chain 'Resource' Performance measures of Beamon (1999) include Total Cost, Distribution Cost, Manufacturing Cost, Inventory and Return on Investment (ROI).

2) **Output measure**

According to Beamon (1999) the purpose of categorizing various variables under 'output' performance measure is because of the observation that without acceptable output, customers will turn to other supply chains. Example list of Beamon (1999) Supply Chain 'Output' Performance Measures includes Sales, Profit, Fill Rate, On – Time Deliveries, Backorder/ Stock Out, Customer Response Time, Manufacturing Lead Time, Shipping Errors and Customer Complaints.

3) **Flexibility measure**

According to Beamon (1999) the purpose of categorizing various variables under 'flexibility' performance measure is because of the observation that in an uncertain environment, supply chains must be able to respond to changes. The various Supply Chain 'Flexibility' Performance Measures are Volume Flexibility, Delivery Flexibility, Mix Flexibility and New Product Flexibility (Beamon, 1999).

Porter (1985a) argued that to understand Competitive Advantage of a firm, one should also look outside the firm since Competitive Advantage is gained from various discrete activities that the firm performs together with its suppliers and other partners. The above observations underscore the significance of SCP in developing Competitive Advantages by individual firms operating in its respective supply chain.

Competitive Advantage (CA)

Competitive Advantage in business academics emerged in the late 1970s. It was based on the success model of Japanese firms (South, 1981). Competitive Advantage is defined as achieving a position of ensuring superiority by a firm over its competitors through customer preference (Anatan 2014; Christopher, 1998). Commercial success in competitive context involves (1). Cost Advantage; (2). Value Advantage and (3). Cost and Value Advantages combined (Christopher, 1998). Efficient supply chain and logistics management can contribute significantly to cost reduction. This is because for most industries logistics cost covers a major share of the company's total cost (Christopher, 1998).

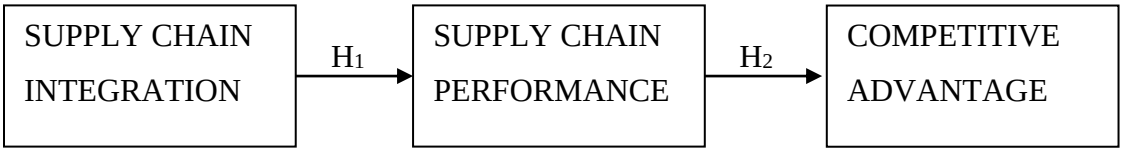
Expanding on the previous literature studies examining various dimensions of CA, Koufteros (1995) developed a research framework for describing different competitive capabilities. The five dimensions of CA that are identified in the framework by Koufteros (1995) are competitive pricing, premium pricing, quality, dependable delivery and product innovation. Li, Ragu-Nathan, Ragu-Nathan, and Rao (2004) further studied about identifying the influence of Supply Chain Practices on CA and Firm Performance. The researchers referred to the framework developed by Koufteros (1995) for defining the dimensions of Competitive Advantage variable. As such, Li et al. (2004) identified product innovation, price/cost, delivery dependability, time to market, and quality as the five dimensions of CA variable in their study.

In this thesis paper, the researcher referred to the questionnaire adopted by Li et al. (2004) for measuring CA variable. However, after careful consideration of the business model of tailoring shops in Thailand, the researcher observed that the relevance of measuring delivery dependability dimension of Competitive Advantage variable is very minimal since the business model of these small enterprises does not warrant the need for being involved in any delivery / logistics activities. Most of the time, these companies rely on third party logistics operators or last mile delivery service providers for delivering the products to the end customers. As such, the researcher did not consider the measurement items related to delivery dependability while examining CA.

CONCEPTUAL FRAMEWORK

For understanding how SCP will influence CA, a framework was established as given in figure 1.

Figure 1: Conceptual Framework
Relationship between SCI, SCP and CA



The two hypotheses proposed in the study are the following.

H_{1a}: Supply Chain Integration is positively related to Supply Chain Performance
H_{1b}: Supply Chain Performance is positively related to Competitive Advantage

METHODOLOGY

In this research, quantitative questions are used which includes five point Likert scale as well as category scale. The target sample of this study comprises of managers of tailoring shops in Bangkok, Hua Hin and Pattaya in Thailand. The main reason for focusing on these three cities has been its popularity among the extraordinary number of international tourists visiting the tourist locations of Bangkok, Hua Hin, and Pattaya. This over the years resulted in business

operations of a vast number of tailoring shops traditionally catering to international tourists, leveraging on the popularity of the tourism industry in Thailand. According to the report published by international commercial real estate firm, Jones Lang LaSalle (2019), by the end of the year 2018, the cities of Bangkok, Hua Hin, and Pattaya welcomed 20.2 million, 1.4 million, and 9 million international tourists respectively.

The researcher considered only the non-probability sampling techniques of Convenience Sampling and Judgment Sampling for this specific research survey. Convenience sampling was used to focus the research on target sample that are operating in more tourist-centered areas in Bangkok province, Hua Hin in Prachuap Kiri Khan province, and Pattaya area in Chonburi province. Judgment sampling was used to select the respondents from the target sample who have proficiency in English language.

A total of 423 questionnaires were collected directly from the tailoring shop manager, 410 of which were usable. The researcher adopted 'cases listwise' method in dealing with the missing data that were observed in the dataset. This method involves excluding any case with identified missing value. Table 1 presents the geographical dispersion of data collected for this study covering mostly popular tourist attraction areas in Bangkok, Hua Hin and Pattaya in Thailand.

Table 1: Geographical Dispersion of Research Data Obtained

City/ Popular areas	Number of Respondents	Percentage of Total Respondents
Bangkok (Bangkok Province)	310	76%
Hua Hin (Prachuap Khiri Khan Province)	32	8%
Pattaya (Chonburi province)	68	16%

The researcher applied inferential analysis to examine the relationship between the various independent and dependent variables of the study. Structured Equations Modeling (SEM) was employed for analyzing the relationship between the independent variables and the dependent variable.

Under descriptive analysis, the results of frequency analysis show that 84.9 percent of the respondents were of the opinion that the length of the relationship with key suppliers was more than 5 years. With respect to length of relationship with key customers, 51.2 percent of the respondents answered that the length of relationship with their key customers were from 1 to 5 years.

The reliability of each of the research constructs were assessed with Cronbach's Alpha. The results show that the alpha value was over 0.7 for all constructs. According to Sekaran (1992) if the alpha coefficient is more than or equal to 0.6 per variable, then it implies that the research instrument is reliable and valid. Table 2 shows the Alpha test results for each for the research constructs of the study. From Table 2, it can be observed that the alpha test results for all constructs are above 0.6 thresholds, hence validating the internal consistency of the data collected.

Table 2: Alpha Test Results of Research Constructs

Variable	Number of items	Alpha Test
Supply Chain Integration (SCI)	10	0.732
Supply Chain Performance (SCP)	14	0.786
Competitive Advantage (CA)	13	0.809

In this study, SCI, SCP, and CA represent the three constructs to which the measurement items are grouped. In order to analyze the uni-dimensionality and validity of the research model, the researcher studied the CFA of each of main research constructs and their respective dimensions separately (Garver & Mentzer, 1999). According to Hair et al. (2006), when the respective indicators of the research construct have an acceptable fit on a single-factor model, uni-dimensionality is observed.

The interrelationships proposed in the framework were tested using Structural Equation Modeling (SEM). Maximum Likelihood Estimation (MLE) was used to fit the SEM models. Maximum Likelihood Estimation with missing data is a standard option in at least two structural equation modeling programs, Amos (Arbuckle, 1995) and Mx (Neale, 1994).

The first order constructs of SUI, CUI, FLP, REP, OUP and CA results showed that the model fitted the data well since either all of the baseline indices were above the threshold of 0.9 and /or RMSEA was at the required range of less than 0.008.

SCI and SCP are conceptualized as second – order models. SCI second order model composes of SUI and CUI as its two dimensions. SCP composes of FLP, REP and OUP as its three dimensions. The fit statistics for SCI second – order model were GFI = 0.964; RMSEA = 0.073; NFI = 0.939; IFI = 0.957; TLI = 0.933; CFI = 0.957, indicating that model fitted the data well. The coefficients were all significant at $P<0.001$.

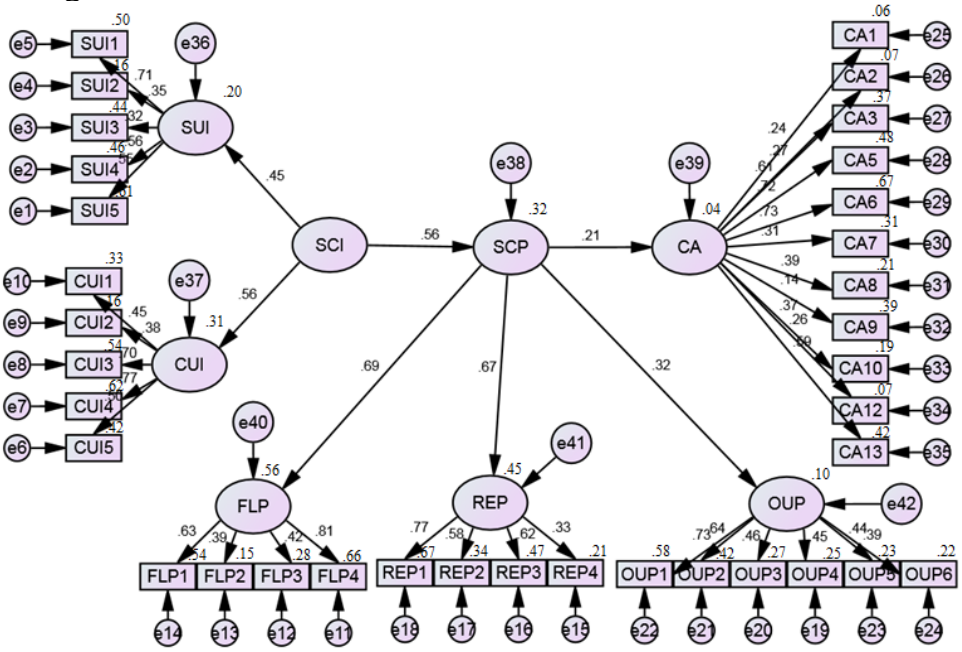
For SCP the fit statistics were GFI = 0.954; RMSEA = 0.053; NFI = 0.904; IFI = 0.946; TLI = 0.924; CFI = 0.945, representing that the model fitted the data well. The coefficients were also significant at $P<0.001$. Maruyama (1998) highlighted that if each CFA model construct is good independently, the structure model will be identified.

RESULTS OF THE STRUCTURAL MODEL

Figure 2 displays the path diagram resulting from SEM analysis using AMOS statistical software with MLE as the estimation technique.

The results exhibit that all the measurements have significant loadings to their corresponding second – order construct. Overall, the model has a satisfactory fit with GFI = .903, NFI = 0.862, IFI = 0.931, TLI = 0.908 and CFI = 0.929. The RMSEA was only 0.046 indicating that the model fitted the data very well (Ho, 2006).

Figure 2: Structural Relations and Coefficients for the Base Model



Note: GFI = 0.903; RMSEA = 0.046; NFI = 0.862; IFI = 0.931; TLI = 0.908; CFI = 0.929.

To test the hypothesized relationship between SCI, SCP and CA, the researcher relied on standardized estimates and R square values obtained in the path analysis and corresponding p – value as shown in Table 3.

Table 3: Regression Weights and R Square values obtained under MLE method

Hypotheses		**Standardized Regression Weights**	**R Square value**	**P – value**	**Result**
H_1	SCI → SCP	.561	.315	.002	Supported at P<.01
H_2	SCP → CA	.207	.043	.015	Supported at P<.05

Hypothesis 1: Supply Chain Integration (SCI) is positively related to Supply Chain Performance (SCP)

The relationship between SCI and SCP was examined and the results showed that H_1 is supported since the p value was significant (p<.01). The Squared Multiple Correlation (r^2) value of .315 indicates that 31.5 percent of variance in SCP is explained by SCI. The baseline comparison indices obtained are GFI = 0.903; NFI = 0.862; IFI = 0.931; TLI = 0.908 and CFI = 0.929. RMSEA value of 0.046 indicates a good model fit (Ho, 2006).

Majority of the previous empirical studies examining the relationship between SCI and SCP found a statistically significant positive relationship between the two variables (Armistead & Mapes, 1993; Bagchi et al., 2005; Lee et al., 2007; Seo et al., 2014; Sezen, 2008; Zailani & Rajagopal, 2005). Hence, the findings of the study are consistent with the previous literature.

H_2: Supply Chain Performance (SCP) is positively related to Competitive Advantage (CA)

The structural model examined the relationship between SCP and CA with the results showing that H_2 is supported since the p value was significant ($p<.05$). The baseline comparison indices obtained are GFI = .903; NFI = .862; IFI = .931; TLI = .908 and CFI = .929. RMSEA value of .046 indicates a good model fit (Ho, 2006).

Hence, based on the p – value the relationship between SCP and CA is significant. This is consistent with the study of Liu (2011) who found significant positive relationship between SCP and CA among manufacturing firms in China. However, Squared Multiple Correlation (R^2) of .043 indicates that only 4.3 percent of the variance in CA is explained by SCP. This leaves ample room to explore additional factors which might influence CA in firm level in the context of the target sample.

CONCLUSION

Based on the findings, the researcher was able to answer the research question addressing the direct relationship between SCI and SCP variables as well as between SCP and CA variables. The research question is addressed in the context of small enterprises in the cities of Bangkok, Hua Hin and Pattaya in Thailand. The results show that SCI has a direct significant positive influence on SCP with 31.2 percent of variance in SCP can be explained by SCI. Additionally based on the p value results, it is observed that SCP has a direct significant positive influence on CA. However, only 4.3 percent of variance in CA can be explained by SCP.

It is found that 'information sharing' plays a crucial role with respect to integration with customers and suppliers. Information Technology (IT) is also found to be of certain importance especially with respect to upward integration with suppliers since many of the respondents agreed that they rely on IT platforms for information exchange with their suppliers. Majority of the respondents also agreed that they have a high level of market information sharing with customers and that the tailoring shop managers share information to customers using information technology.

The results of the study also show that tailoring shop managers lack initiative to expand to other facets of integration such as strategic partnership with suppliers or joint planning with suppliers. This leaves ample room to explore the reasons for such lack of interest from the tailoring shop managers for a more comprehensive integration of their supply chains.

With respect to SCP and CA, the results of the study showed that there is a significant positive relationship between SCP and CA with the results showing that SCP explains 4.3 percent variance in CA. The findings are similar with the previous study of Liu (2011), which found a significant positive relationship between SCP and CA among manufacturing firms in China. However, in this thesis study on tailoring shops in Thailand, the variance caused by SCP on CA is a very low percentage. This leaves ample room to examine other factors which might influence CA in the firm level.

With respect to the managerial implications of the study, the researcher would like to highlight the importance of *integration amongst competitors* by essentially leveraging on IT communication platforms which would enable sourcing of required fabrics among the members of such platforms. This can help them to purchase only the required measurements rather than meeting the minimum quantity requirements for buying from wholesalers.

The reasoning behind this observation is that there might be some tailoring shop managers who might be eager to reduce the stock of a particular pattern of fabric stock which they might be having for a long time, while at the same time another tailoring shop manager have a customer who requested for this particular pattern which is not commonly found or demanded. The tailoring shop manager who received the demand can communicate the same in the IT platform and hence likely can connect with the tailoring shop managers who might be eager to reduce the stock of the same fabric. With already established pricing structure for trading among members in the platform, *integration between competitors* can be a 'win – win' model for the tailoring shop managers.

Additionally, results of the study also show that tailoring shop managers are not very forthcoming in building strategic partnerships with suppliers. According to Christopher (1998), competitive advantage can be achieved either by being the lowest cost producer or by providing differentiated value additions such as superior customer service, or by achieving a combination of cost and value addition. Due to the homogeneity of the products and services offered with respect to bespoke tailoring in Thailand, the scope for differentiating in terms of value can be minimal. Hence, it might be worthwhile for managers of tailoring shops to consider the possibility of establishing strategic partnership with tailoring factories, if possible to the extent of vertical integration, in order bring down the cost of production over time.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

There are several limitations to the study. First of all, this thesis research study focuses on the retail tailoring shops operating in the cities of Bangkok, Hua Hin, and Pattaya in Thailand. Therefore it might not be suitable to generalize the results of the study to other industries. Furthermore, the size of the firms in this particular study involves only small business enterprises. Hence, the findings of this study may not be applicable to medium enterprises or large business enterprises. Another major limitation of the study is that the researcher only considered external integration dimensions under SCI variable, especially with respect to adopting the questionnaire tool for data collection. This is because it was observed that the applicability of internal integration for small tailoring shops is very minimal or sometimes non-existent.

Recommendations for future research involve firstly finding opportunities to base the future researches on longitudinal study. This allows re-examining the factors studied in the model. Secondly, to replicate the research model in order to investigate the relationship between the constructs in the context of medium and large business enterprises in textile or other industries in Thailand to help validate the applicability of the results in different business settings in the country.

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