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SCOR MODEL FACTORS AFFECTING THE SUCCESS OF FOOD DELIVERY BUSINESS IN THAILAND

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Abstract

The contemporary food delivery industry in Thailand has witnessed exponential growth, prompting the need for an analysis of critical success factors. This study explores the application of the SCOR (Supply Chain Operations Reference) model to identify factors crucial to the outcomes of food delivery businesses. Through empirical analysis, the study reveals that effective planning strategies are essential for enhancing sourcing activities and, consequently, delivery operations. Additionally, strategic sourcing activities significantly contribute to improving the production process, emphasizing that acquiring quality resources enhances the capacity to produce goods and services efficiently. While sourcing plays a vital role, it may not be the sole determinant of successful delivery and returns. Other variables, such as logistical efficiency, transportation, and customer service, can also impact these processes, as indicated by the research. Interestingly, the direct effect of the production process on delivery and returns appears to be insignificant. The findings underscore the importance for Thai food delivery companies to prioritize well-structured planning and astute sourcing strategies to enhance overall performance. This paper serves as a foundational resource for food delivery industry stakeholders, providing strategic insights for improved operational outcomes. For a comprehensive understanding of the industry's dynamics, additional research is recommended to dissect specific factors influencing delivery and return processes.

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Introduction

The food delivery industry has witnessed tremendous growth worldwide, and Thailand is no exception. Technological advancements, shifting consumer preferences, and the convenience of mobile applications have contributed to making the Thai food delivery market highly competitive. In this dynamic market, the success or failure of food delivery businesses depends on several factors. This study utilizes the Supply Chain Operations Reference (SCOR) model, a comprehensive framework for analyzing supply chain performance, to gain a deeper understanding of these factors. According to Van Weele (2018), a well-structured supply chain is essential for the profitable operation of any business, including the food delivery industry. As food delivery businesses involve multiple stages, such as planning, sourcing, preparing, delivering, and managing returns (Reiner & Hofmann, 2006), returns management is crucial to their success. However, in a highly competitive market like Thailand, where consumers expect not only timely delivery but also quality and individualized experiences, the efficacy of these processes becomes even more essential (Li & Lee, 1994).

The Supply Chain Council's SCOR model is a widely recognized framework for assessing supply chain performance (Akyuz & Erkan, 2010). Its five core processes provide an all-encompassing perspective of a supply chain and can be applied to numerous industries, including food delivery services. This study employs the SCOR model to determine how specific business processes within the food delivery supply chain in Thailand contribute to overall performance and, consequently, business success.

Numerous studies have investigated the factors that influence success in different regions. Shroff et al. (2022) identified customer satisfaction, delivery time, and food quality as crucial success factors (Li et al., 2020). Similarly, they highlighted the importance of effective order management and logistics coordination in the success of food delivery services in South Korea (Li et al., 2020). Despite the valuable insights provided by these studies, it is essential to examine the unique cultural, economic, and regulatory factors impacting Thailand's food delivery industry (Limsarun et al., 2021).

Using the SCOR model as a framework for analysis, this study aims to fill this research gap by examining the specific factors influencing the success of food delivery businesses in Thailand. The research will investigate how each SCOR process influences supply chain performance and, ultimately, the success of Thai food delivery companies. This study will contribute to the existing body of knowledge and provide industry practitioners and policymakers with actionable recommendations to enhance the efficiency and effectiveness of food delivery services in Thailand. In the following sections of the literature review, previous research on the food delivery industry, supply chain management, and the SCOR model will be examined. The section on model development will elaborate on the SCOR business processes and supply chain performance before developing hypotheses. The research methodology will then describe the data collection and analysis procedures, including the use of a structured questionnaire. Based on the research findings, the results will be presented, discussed, and conclusions and recommendations will be drawn.

Literature Reviews

SCOR Model

The Supply Chain Council's Supply Chain Operations Reference (SCOR) model has become a widely accepted framework for evaluating and enhancing supply chain performance. The model comprises five fundamental processes: Plan, Source, Make, Deliver, and Return, providing an end-to-end perspective of the supply chain. By adopting the SCOR model, businesses can identify inefficiencies, optimize processes, and improve collaboration with supply chain partners (Ntabe et al., 2015). Numerous studies have demonstrated the effectiveness of the SCOR model across various industries. For instance, Georgise et al. (2012)

found that the implementation of the SCOR model in the manufacturing sector reduced lead times and improved customer service. Similarly, Ahmed & Ahmed (2016) demonstrated that adopting the SCOR model improved order fulfillment and delivery accuracy, positively affecting customer satisfaction. However, there is a lack of research directly applying the SCOR model to the Thai food delivery industry.

Food Delivery in Thailand

The growth of the food delivery market in Thailand has been driven by urbanization, changing lifestyles, and digitalization (Chotigo & Kadono, 2021). Mobile applications and online platforms have significantly influenced consumer behavior, leading to an increased demand for food delivery services (Ray & Bala, 2021). Multiple studies have examined factors influencing the adoption of food delivery services in Thailand (Phrapratanporn et al., 2022), including convenience, affordability, and menu diversity (Chotigo & Kadono, 2021). However, the unique characteristics of the Thai market pose specific challenges for food delivery businesses. For instance, Limsarun et al. (2021) emphasized the importance of understanding the preferences and cultural nuances of Thai consumers to effectively tailor services. Moreover, the reliance on motorcycle delivery drivers and the unpredictability of urban traffic present operational difficulties (Puriwat & Tripopsakul, 2021). The application of supply chain management practices, such as the SCOR model, could play a crucial role in enhancing overall performance to address these issues.

Supply Chain Management:

Supply chain management (SCM) has gained prominence as a strategic instrument for enhancing competitiveness and ensuring efficient operations across numerous industries (Bechtel & Jayaram, 1997). SCM involves managing the flow of goods, services, and information from suppliers to end consumers in the food delivery industry (Giannakis & Croom, 2004). Effective SCM practices can decrease delivery lead times, optimize inventory levels, and boost customer satisfaction (Nabhani & Shokri, 2009).

Researchers have investigated the relationship between SCM and the success of food delivery companies in other regions. For instance, Ofori (2000) and Wu & Huang (2018) examined the effect of SCM practices on the performance of food delivery companies in Singapore and discovered that effective inventory management and collaboration with suppliers were crucial to success. Similarly, Tran (2021) inspected SCM practices in the Vietnamese food delivery industry and emphasized the significance of supply chain partner coordination for on-time and accurate deliveries.

However, little research has been conducted on the application of SCM practices in Thailand's food delivery industry, particularly using the SCOR model. Understanding how SCM practices influence the success of food delivery businesses in Thailand is crucial for sustaining growth and remaining competitive as the market continues to evolve.

Research Methodology

This study employs a quantitative research approach to investigate the factors influencing the success of food delivery businesses in Thailand and to test the hypotheses developed during the research. This section outlines the research design, data collection procedures, and data analysis methods utilized to achieve the research objectives. The primary aim of this research is to gather 341 data points from various food delivery companies in Thailand. Subsequently, the data will be analyzed using SPSS (Statistical Package for the Social Sciences) for descriptive purposes, and Structural Equation Modeling (SEM) will be applied to test hypotheses (Barrett, 2007).

Research Design

To collect data from active food delivery services across various regions of Thailand, the research will employ a cross-sectional research strategy. This design allows for the collection

of data at a specific point in time, providing a snapshot of the factors influencing success in the industry. The cross-sectional method is suitable for examining relationships between the variables under study and gaining insights into the current state of Thailand's food delivery market.

Data Collection

Primary data for this study will be collected using a questionnaire formatted in a specific manner. The questionnaire design will be based on the SCOR model and previous research on the food delivery industry and supply chain management. Likert scale questions (Nemoto & Beglar, 2014) will form the survey, where respondents rate their agreement or disagreement with specific statements on a scale ranging from 1 to 5 (Brayfield & Rothe, 1951).

The selection of food delivery companies to participate in the research will employ purposive sampling. Companies with a substantial presence in the Thai food delivery market and activity in both urban and suburban areas will meet the criteria for sample selection. The target number of observations for the sample size is set at 341, with the objectives of attaining a satisfactory level of statistical power for SEM analysis and ensuring that the sample adequately represents the sector (Reinartz et al., 2009).

Data Analysis

SPSS, a popular statistical software package for the social sciences, will be utilized to perform the analysis on the data that was gathered. To summarize the responses and offer a clearer understanding of the sample characteristics, descriptive statistics such as mean, standard deviation, and frequency distributions will be employed. (Nemoto & Beglar, 2014).

The Structural Equation Model (SEM) will be employed to test the hypotheses and examine the relationships between the variables. SEM is a powerful statistical method that allows for the investigation of multiple dependent and independent variables simultaneously (Hair et al., 2012). Throughout this research, SEM will assist in determining the connections between SCOR business processes, supply chain performance, and the achievements of food delivery companies in Thailand.

The reliability and validity of the questionnaire will be assessed before conducting structural equation modeling. Cronbach's alpha will be employed to calculate the instrument's reliability, ensuring that the questionnaire items consistently measure the constructs. The reliability of the measures and their capability to assess distinct aspects of the constructs will be validated through tests of convergent and discriminant validity (Hair et al., 2012).

Ethical Considerations

To ensure ethical conduct, this study will adhere to ethical guidelines for human participant research. Informed consent will be obtained from the participants, and all responses will be kept anonymous and confidential. Furthermore, the research will undergo review and approval by the institution's research ethics committee. By following this research methodology, the study aims to offer valuable insights into the factors influencing the success of food delivery businesses in Thailand and contribute to the existing body of knowledge on supply chain management and the application of the SCOR model.

Results

Analysis of the Reliability and Validity of Influential Factors from the SCOR Model in the Food Delivery Supply Chain Impacting Business Success

The analysis, presenting a summary of factors influencing the success of food delivery services and a comprehensive list of various impactful factors, categorizes them into the following five stages: Factors related to the planning stage (Planning), the sourcing stage (Source), the manufacturing stage (Make), the delivery stage (Delivery), and the return stage (Return). These categories are crucial for ensuring the success of businesses specializing in food delivery.

Table 1 Descriptive analysis

Variables	Min	Max	Average	S.D	Skewness	kurtosis
PLAN1	2.0	5.0	4.308	0.6613	-0.678	0.465
PLAN2	2.0	5.0	4.331	0.6220	-0.592	0.534
PLAN3	3.0	5.0	4.326	0.6661	-0.481	-0.748
PLAN4	2.0	5.0	4.308	0.6959	-0.817	0.635
PLAN5	2.0	5.0	4.375	0.6729	-0.732	-0.073
SOURCE1	3.0	5.0	4.455	0.6149	-0.666	-0.509
SOURCE2	3.0	5.0	4.402	0.6324	-0.573	-0.609
SOURCE3	2.0	5.0	4.513	0.6164	-1.036	0.778
SOURCE4	1.0	5.0	4.455	0.6520	-1.175	2.232
SOURCE5	2.0	5.0	4.504	0.5972	-0.851	0.184
MAKE1	1.0	5.0	4.311	0.8208	-1.401	2.327
MAKE2	2.0	5.0	4.374	0.7517	-1.239	1.497
MAKE3	2.0	5.0	4.334	0.7274	-1.070	1.242
MAKE4	2.0	5.0	4.402	0.7630	-1.423	2.058
MAKE5	2.0	5.0	4.396	0.7103	-1.138	1.320
MAKE6	2.0	5.0	4.314	0.7385	-0.970	0.797
DELIVER1	3.0	5.0	4.478	0.6065	-0.711	-0.456
DELIVER2	2.0	5.0	4.419	0.6576	-0.761	-0.210
DELIVER3	1.0	5.0	4.362	0.7092	-0.950	0.967
DELIVER4	2.0	5.0	4.405	0.6906	-1.055	1.075
DELIVER5	2.0	5.0	4.434	0.6592	-0.808	-0.161
DELIVER6	3.0	5.0	4.396	0.6543	-0.624	-0.622
DELIVER7	2.0	5.0	4.387	0.7254	-1.020	0.619
RETURN1	3.0	5.0	4.408	0.6286	-0.576	-0.600
RETURN2	2.0	5.0	4.399	0.6592	-0.769	0.065
RETURN3	2.0	5.0	4.361	0.6522	-0.592	-0.340
RETURN4	1.0	5.0	4.258	0.8140	-1.395	2.857
RETURN5	1.0	5.0	4.402	0.7475	-1.403	2.597

The test results are summarized in Table 1, indicating an average value of 4.38 and a standard deviation of 0.683 for all 28 variables. The variables can range from 1 to 5 at their most extreme. All values fall within a reasonable range of 3, considered normal when measuring skewness and kurtosis (Hair et al., 2021). Consequently, the evaluation of the dataset's skewness and kurtosis for all 28 variables did not reveal any significant deviations from the norm. From this, it can be inferred that the measurements of skewness and kurtosis, along with the variability of the 28 metric variables, do not encounter any issues related to the data not being normally distributed. The dataset's lack of significant departures from normality, as indicated by the skewness and kurtosis observations for these variables, can be considered reassuring evidence.

Validity and Reliability Test

According to Table 2, this study utilized Cronbach's alpha to assess reliability, yielding the following results: 0.870 for the Planning factor, 0.892 for the Sourcing factor, 0.899 for the Making factor, 0.922 for the Delivery factor, and 0.894 for the Return factor. All these values surpass 0.7, indicating the reliability of the measurement and the appropriateness of the indicators chosen to assess the construct.

Table 2 Validity and Reliability test

Variable group	No.	Items	CR	AVE	CB
(Plan)	1	PLA1	0.86	0.57	0.870
	2	PLA2			
	3	PLA3			
	4	PLA4			
	5	PLA5			
(Source)	6	SOU1	0.88	0.61	0.892
	7	SOU2			
	8	SOU3			
	9	SOU4			
	10	SOU5			
(Make)	11	MAK1	0.89	0.59	0.899
	12	MAK2			
	13	MAK3			
	14	MAK4			
	15	MAK5			
	16	MAK6			
(Delivery)	17	DEL1	0.90	0.61	0.922
	18	DEL2			
	19	DEL3			
	20	DEL4			
	21	DEL5			
	22	DEL6			
	23	DEL7			
(Return)	24	RET1	0.92	0.62	0.894
	25	RET2			
	26	RET3			
	27	RET4			
	28	RET5			

For the evaluation of construct validity, three concurrent indices were employed: the Average Variance Extracted (AVE), which should exceed 0.5 (Fornell & Larcker, 1981). The findings reveal that all five factors exhibit AVE values greater than 0.5, as shown in Table 2. Additionally, the Construct Reliability (CR) should exceed 0.7 (Hair et al., 2021). Table 2 indicates that all five factors have CR values greater than 0.7. Overall, the construct validity levels are satisfactory, indicating that the research model is suitable for evaluating the structural relationships between the factors.

Additionally, the analysis delves into the research model's goodness-of-fit, estimating standard errors, t-values (Critical Ratio), p-values, total effects, direct effects, and indirect effects. Model fit indices are used to ensure the model's observability and identify potential modifications if necessary (Sanders, 2015). The tested factors represent a set of variables reflecting the fundamental structure in the data, aimed at analyzing the validity of the measurement factors impacting supply chain performance in the food delivery business. Confirmatory factor analysis is employed to assess the appropriateness of assumptions regarding the relationships between all relevant variables and to test the significance of each one's contribution. This model comprises 28 observed variables and seven latent variables.

Analysis of the Impact from Supply Chain Model Factors Affecting the Success of the Food Delivery Business

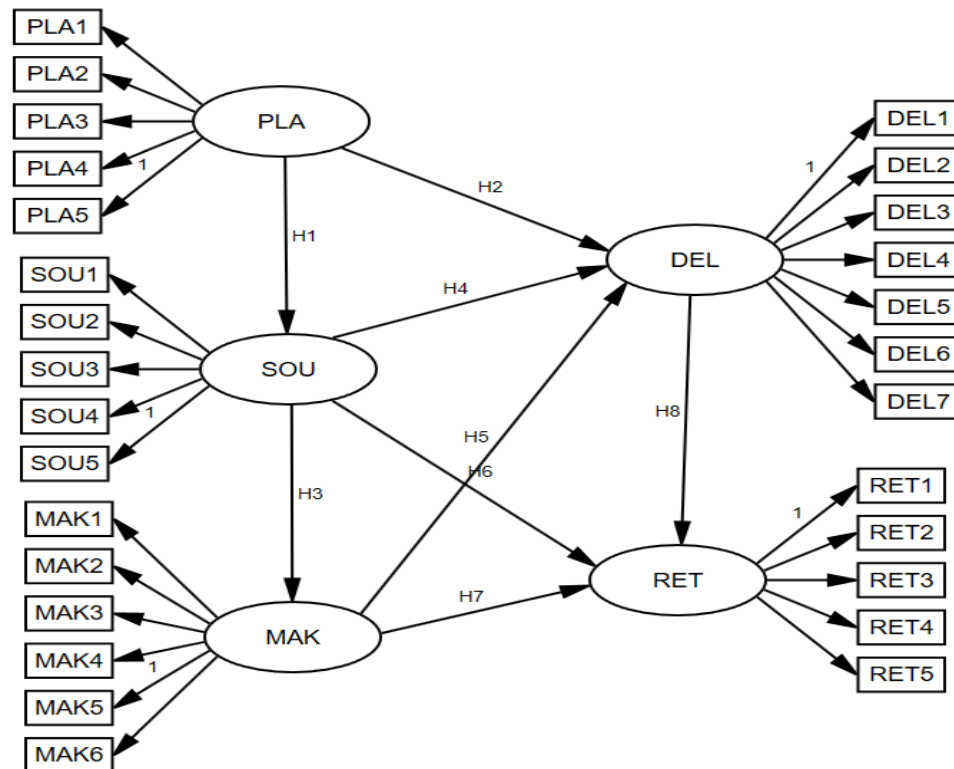


Figure 1 Summary of the items and structure of the measurement model

Table 3 Goodness-of-fit indices (GOF)

Chi-square		Absolute Fit Indices		Incremental Fit Indices	
p-value	0.00	RMSEA	0.69	CFI	0.920
CMIN/df	2.611	RMR	0.25	TLI	0.912
		GFI	0.840	IFI	0.920
		AGFI	0.810	TLI	0.912

Table 3 presents the goodness-of-fit (GOF) measurement for the relevant items. The model has achieved more suitable indices: a p-value of 0.00, CMIN/df of 2.611, GFI of 0.840, RMSEA of 0.69, RMR of 0.025, CFI of 0.920, TLI of 0.912, and NFI of 0.906. While the GFI and AGFI values are slightly below the 0.9 threshold (Hair et al., 2012), it's important to note that both indices are sample-size dependent and tend to increase with larger sample sizes. Given that the researchers have reached the maximum sample size and cannot further increase the number of samples, they have also considered the Incremental Fit Index (IFI) and Tucker-Lewis Index (TLI), which are sample-size independent. In the context of the research, the model has demonstrated sufficient fit and acceptable goodness-of-fit indices. Therefore, the dataset can be utilized for further analysis.

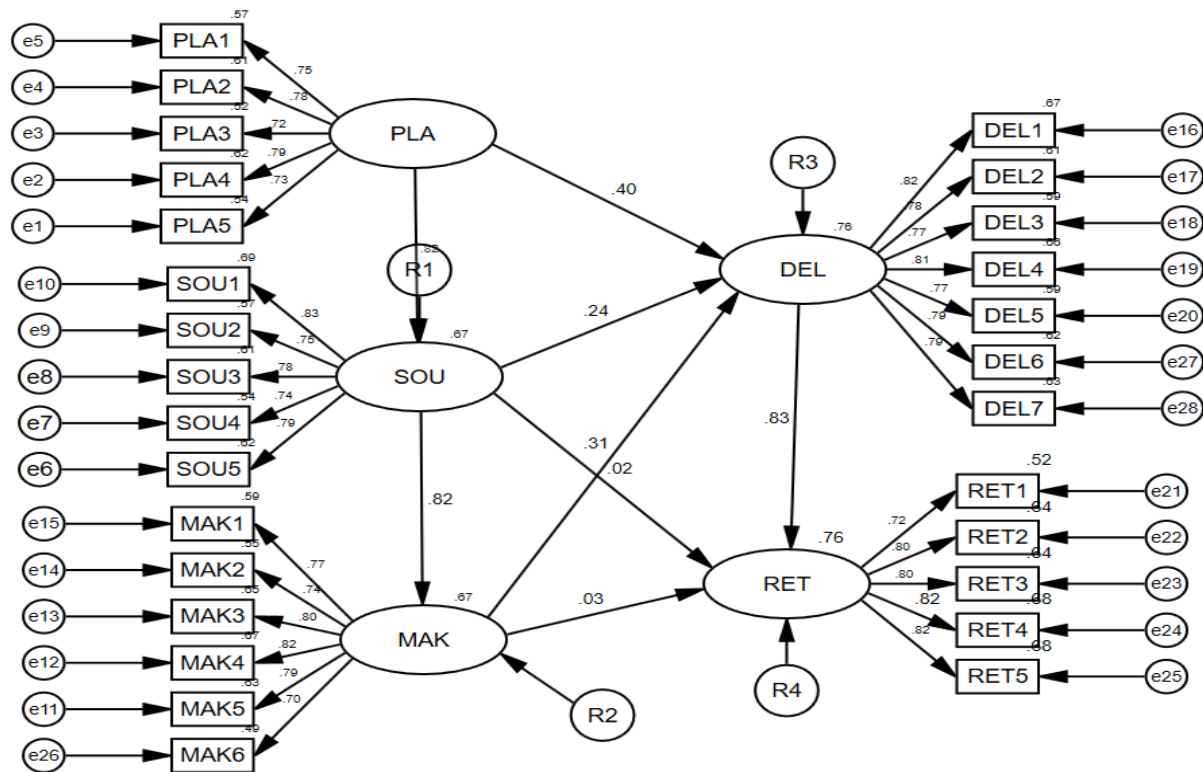


Figure 2 Full Mediation Effect

From Figure 2, the structural analysis reveals the coefficients of determination (R2) for the latent variables: PLA1 = 0.57, PLA2 = 0.61, PLA3 = 0.52, PLA4 = 0.62, and PLA5 = 0.53. Similarly, the R2 values for the Sourcing factor are SOU1 = 0.69, SOU2 = 0.57, SOU3 = 0.61, SOU4 = 0.54, and SOU5 = 0.62. Additionally, the R2 values for the Making factor are MAK1 = 0.59, MAK2 = 0.55, MAK3 = 0.65, MAK4 = 0.67, MAK5 = 0.63, and MAK6 = 0.49. DEL1 = 0.69, DEL2 = 0.61, DEL3 = 0.59, DEL4 = 0.66, DEL5 = 0.59, DEL6 = 0.62, and DEL7 = 0.63 are the R2 values for the Delivery factor. Finally, the R2 values for the Return factor are RET1 = 0.52, RET2 = 0.64, RET3 = 0.64, RET4 = 0.68, and RET5 = 0.68.

The proportion of the variance in the dependent latent variables explained by the independent latent variables clarifies the analysis of the relationship between dependent and independent variables. This percentage is represented by R2 or R-Square, with an ideal value of at least 0.25 (Hair et al., 2012) indicating that the independent variables adequately explain the variance in the dependent variables. In this study, all 28 latent variables have R2 values greater than 0.25, indicating that the variance in the dependent variables is adequately explained.

Table 3 Hypothesis testing

Hypotheses	Path	Loading	S.E.	t -values	p values	Results
1	SOU <--- PLA	0.781	0.087	12.046	***	Support
2	DEL <--- PLA	0.401	0.090	5.11	***	Support
3	MAK <--- SOU	0.982	0.085	13.09	***	Support
4	DEL <--- SOU	0.251	0.148	2.309	0.021	Not Support
5	DEL <--- MAK	0.275	0.237	4.276	***	Support
6	RET <--- SOU	0.02	0.02	0.23	0.818	Not Support
7	RET <--- MAK	0.027	2.87	0.433	0.665	Not Support
8	RET <--- DEL	0.760	0.063	8.682	***	Support

The results of the path coefficient analysis, presented in Table 3, provide support for the following hypotheses:

- 1) The Sourcing factor (Source) is significantly influenced favorably by the Planning factor (Plan) ($= 0.781$; $SE = 0.087$; $t\text{-value} = 12.046$; $p 0.001$). Thus, H1 is approved.
- 2) The Planning factor (Plan) significantly influences the Delivery factor ($= 0.401$; $SE = 0.090$; $t\text{-value} = 5.11$; $p 0.001$), according to Hypothesis 2 (H2). Thus, H2 is approved.
- 3) The Making factor (Make) is significantly influenced favorably by the Sourcing factor (Source) ($= 0.982$; $SE = 0.085$; $t\text{-value} = 13.09$; $p 0.001$), according to Hypothesis 3 (H3). Thus, H3 is approved.

- 4) The Sourcing factor (Source) does not significantly positively affect the Delivery factor ($= 0.251$; $SE = 0.148$; $t\text{-value} = 2.309$; $p = 0.021$). Thus, H4 is rejected.

- 5) The Delivery factor is not positively impacted by the Sourcing factor (Source).

The Return factor is significantly influenced positively by the Sourcing factor (Source) ($= 0.275$; $SE = 0.237$; $t\text{-value} = 4.276$; $p 0.001$), according to Hypothesis 5 (H5). Thus, H5 is approved.

- 6) The Making factor (Make) does not significantly affect the Delivery factor, according to Hypothesis 6 (H6) ($= 0.02$; $SE = 0.02$; $t\text{-value} = 0.23$; $p 0.818$). Thus, H6 is rejected.

- 7) The Delivery factor (Deliver) is not positively impacted by the Making factor (Make), and the Return factor (Return) is not significantly positively impacted by the Making factor (Make) ($= 0.027$; $SE = 2.87$; $t\text{-value} = 0.433$; $p 0.665$). Thus, H7 is rejected.

- 8) The Return factor (Return) is not positively impacted by the Making factor (Make), and the Delivery factor (Delivery) significantly influences the Return factor in a positive way ($= 0.760$; $SE = 0.063$; $t\text{-value} = 8.682$; $p 0.001$). Thus, H8 is rejected.

In conclusion, the path coefficient analysis supports several hypotheses, indicating meaningful relationships between certain variables, while rejecting others due to the absence of meaningful relationships.

The results of the path coefficient analysis revealed significant relationships among variables. Specifically, the Planning factor (Plan) significantly benefited both the Sourcing factor (Source) and the Delivery factor. Additionally, the Sourcing factor (Source) exerted a strong positive influence on both the Making factor (Make) and the Return factor. However, the Sourcing factor (Source) had minimal impact on the Delivery factor, and the Making factor (Make) similarly exhibited little to no effect on both the Delivery and Return factors.

Conclusion and Discussion

Many studies focus on the significance of planning in supply chain management, and the finding that effective planning positively influences both sourcing and delivery processes aligns with existing supply chain literature. Effective planning ensures that businesses anticipate issues and have proactive strategies in place. Regarding sourcing and production, the assertion that good sourcing activities enhance the production process is consistent with research, such as Van Weele (2018), which underscores the importance of securing quality resources for optimal production in "Purchasing and Supply Chain Management.

While it may be commonly assumed that effective sourcing should lead to efficient delivery, this study provides an intriguing perspective by suggesting that sourcing might not be the sole determining factor. This perspective may differ from studies closely linking sourcing to delivery efficiency, highlighting the significance of understanding the local nuances and specific challenges of Thailand's food delivery business.

The non-significant relationship between the 'Making' factor and delivery or returns, specific to the food delivery industry, raises interesting questions. In many manufacturing contexts, the "making" process typically impacts delivery, particularly in terms of product quality and

timeliness. This divergence warrants further investigation and could be a potential area for future research.

In terms of broader implications, while the research offers valuable insights into the Thai food delivery industry, a comparative analysis with findings from other markets would be beneficial to identify similarities and differences. Studies on sustainable food supply chains, such as those by Wu & Huang (2018), Limsarun et al. (2021) and Chotigo & Kadono, (2021). may provide perspectives for contrasting with these findings.

The research suggests that customer service plays a role in successful delivery, but the discussion on this aspect could benefit from more in-depth exploration, given the customer-facing nature of food delivery businesses and the importance of customer experience.

Additionally, considering that Tran (2021) investigated the adoption of food delivery apps during the pandemic, drawing parallels between changes in user behavior and their potential impact on SCOR model factors in food delivery businesses could add an interesting dimension to the study. While the discussion aligns with established notions in supply chain literature, it introduces specific insights into the Thai food delivery business context, and some novel findings may serve as a foundation for future research. A broader comparative approach could enhance the study's overall depth and relevance.

In conclusion, the findings of this study underscore the importance of meticulous planning and strategic sourcing in the food delivery sector. Businesses that prioritize strategic planning not only increase their chances of finding cost-effective suppliers but also enhance the timely and error-free delivery of products to customers. Moreover, effective sourcing acts as a catalyst for the manufacturing process, elevating both efficiency and the quality of the final product. However, it's crucial to note that sourcing isn't the sole determinant of success in the delivery and returns processes, even though it holds significant importance. Logistics capabilities, customer service, and adaptability to change also play substantial roles in these operations. These findings emphasize that for food delivery businesses to ensure the smooth functioning of their operations, dedicating resources to meticulous planning and robust sourcing paradigms is essential. The next logical step in this investigation could involve delving into the intricate factors that govern shipping and receiving procedures. Such an inquiry would contribute to a more nuanced understanding of the multifaceted forces at play in the food delivery industry.

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