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Supply Chain Agility: An Adaptation Perspective on the Effect of the COVID-19 Pandemic on Tourism Entrepreneurs at Lad-Etan Island, Nakhon Pathom Province in Thailand

Natapat Areerakulkan^{1*} and Natpatsaya Setthachotsombut²

Abstract

This research aims to find the proper means of establishing supply chain agility for adaptation stemming from the effects of COVID-19 pandemic on tourism entrepreneurs. We developed structural equation model represented supply chain agility by using mixed method based on collecting data obtained from nine groups of related Thai people with Lad-Etan Island tourism group namely; 1) hotels, homestays, 2) restaurants, 3) transportation, cross-river boats, sightseeing boats, 4) shops, gift shops, souvenir shops, 5) merchants of riverside market, 6) tourist attractions, fruit and agricultural gardens, 7) tourists and related people (such as temple), 8) tour companies, and 9) tourist information units around the area. The number of population for this research is large and unspecified where we collected questionnaire samples from 400 people and interviewed samples from 12 people. The descriptive statistics, path analysis, and structural equation modeling are selected data analysis techniques implemented in our study. The major findings are; (1) the supply chain agility consists of four major parts, which are logistics, organization, sensitivity, and information system, (2) model development (SCA-Lad-Etan Island Model). According to the result obtained from structural equation model analysis, supply chain agility gives positive impact to firms' performance in term of time, flexibility or responsiveness, reliability, and costs or costs reduction. Furthermore, critical capabilities that requiring urgent management attention to survive this severe situations are such as managing tourism supply chain flow continuously, responsively, and seamlessly. As well as that the management of the costs in supply chain, targeting the lowest possible total costs for firms' benefit.

Keywords: Supply Chain Agility, Adaptation, COVID-19, Tourism Entrepreneurs, Lad-Etan Island in Thailand

Type of Article: Research Article

* Corresponding author

¹⁻² Lecturer, College of Logistics and Supply chain, Suan Sunandha Rajabhat University,
E-mail: natapat_ar@ssru.ac.th, natpatsaya.se@ssru.ac.th

ความคล่องตัวใช้อุปทาน: บนมุมมองการปรับตัวต่อผลกระทบของโคโรนาไวรัส 2019
ของผู้ประกอบการท่องเที่ยว ณ เกาะลัดทิแท่น จังหวัดนครปฐมของประเทศไทย

ณัฐพัชร อาริรัชกุลกานต์^{1*} และ ณัฏฐภัทรศญา เศรษฐโชติสมบัติ²

บทคัดย่อ

การวิจัยนี้มีจุดประสงค์เพื่อ ค้นหาวิธีสร้างความคล่องตัวโซ่อุปทาน บนมุมมองการปรับตัวต่อผลกระทบของโควิด-19 ของผู้ประกอบการท่องเที่ยว และพัฒนาโมเดลความคล่องตัวโซ่อุปทาน โดยใช้รูปแบบการวิจัยแบบผสม (Mixed Method) เก็บรวบรวมข้อมูลจากผู้เกี่ยวข้องในกลุ่มท่องเที่ยว ณ เกาะลัดอีแท่น จังหวัดนครปฐมในประเทศไทย จำนวน 9 กลุ่ม ได้แก่ 1) โรงแรม ที่พัก โฮมสเตย์ 2) ร้านอาหาร 3) ขนส่ง เรือข้ามฟาก เรือชมวิวยิม 4) ร้านค้า ร้านขายของฝาก ขายของที่ระลึก 5) ผู้ค้าในตลาดริมน้ำ 6) แหล่งท่องเที่ยว สวนผลไม้ สวนเกษตร 7) นักท่องเที่ยวและผู้เกี่ยวข้อง (เช่น วัด) 8) บริษัททัวร์ และ 9) หน่วยงานประชาสัมพันธ์ การท่องเที่ยวในพื้นที่ กลุ่มตัวอย่างแจกแบบสอบถาม 400 คน สัมภาษณ์ 12 คน จากประชากรทั้งหมดไม่ทราบจำนวนแต่ทราบว่ามีความหลากหลาย วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนา การวิเคราะห์เส้นทาง (Path Analysis) และสถิติในการวิเคราะห์โมเดลสมการเชิงโครงสร้าง ผลการวิจัยพบว่า 1) การค้นหาวิธีสร้างความคล่องตัวโซ่อุปทาน: บนมุมมองการปรับตัวต่อผลกระทบของโควิด-19 ของผู้ประกอบการท่องเที่ยว ณ เกาะลัดอีแท่น จังหวัดนครปฐมของประเทศไทย จะต้องประกอบด้วยความสามารถ 4 ด้าน ได้แก่ ด้านโลจิสติกส์ องค์กร ความไว และระบบสารสนเทศ 2) การพัฒนาโมเดล SCA-Lad-Etan Island เมื่อนำโมเดลนี้มาใช้ จะส่งผลเชิงบวกต่อผลการดำเนินงานของบริษัทในด้านเวลา ความยืดหยุ่นหรือการตอบสนอง ความเชื่อถือได้ของการส่งมอบ และค่าใช้จ่ายหรือต้นทุนลดลง ทั้งนี้ ความสามารถที่เป็นสิ่งที่ผู้ประกอบการจะต้องรีบดำเนินการเร่งด่วน เช่น ความสามารถจัดการต่อการไหลของอุปสงค์การท่องเที่ยวได้อย่างรวดเร็ว ความสามารถบริหารค่าใช้จ่ายในโซ่อุปทาน (บริการนักท่องเที่ยว) ได้อย่างมีประสิทธิภาพ ให้มีต้นทุนรวมต่ำสุด เป็นต้น เพื่อให้เกิดประโยชน์ต่อการดำเนินงานของบริษัท

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เกาะลัดที่แห่งประเทศไทย

ประเภทบทความ: บทความวิจัย

* ผู้รับผิดชอบงานหลัก

^{1,2} อาจารย์วิทยาลัยโลจิสติกส์และซัพพลายเชน มหาวิทยาลัยราชภัฏสวนสุนันทา, อีเมล: natapat_ar@ssru.ac.th, natpatsaya.se@ssru.ac.th

1. Introduction

Tourism is very important to Thailand's economic system due to tourism income, which is distributed throughout the country and because of people from all corners of Thailand are employed in this business (Natpatsaya Setthachotsombut & Gritsada Sua-iam, 2020). As shown in the year 2019, more than 39 million tourists visited Thailand where they expended more than 2 trillion Baht. While the projection of Thai government in 2020 were predicted to achieve around 3.38 trillion Baht in other words the country would rise to the top 6 country with the highest tourism income in the world (Bangkokbiznews, 2020).

However, Thailand tourists' situation has changed dramatically for the worse with the spreading of Covid-19 pandemic since last December 2019. Subsequently the Thai government acted quickly and close inland border that prevent any activities of travel to Thailand. Consequently, this COVID issue has given severe negative impacts to the incomes of all those who are employed in tourism supply chain and to the tourism economic sector of Thailand. These negative impacts range from employees working in the sector losing hours or having salary cut rising up to whole businesses going bankrupt. Both international and local tourism has been hit hard, for example in recent time the majority of international tourists came from China, which has all but ended. In addition, local tourists have tended to stop traveling within the country due to fear of contracting of the virus.

The culture of Thai people is to take short leisure brake not above 3 days. Since the short period of leisure trip can refresh the energy and mind without too much travel exhaustion (Jitaphat Chaisit et al., 2018). An example of this kind of travel would be traveling to Lad-Etan Island in the province of Nakhon Pathom as it only a short distance away where the tourist groups are from Bangkok and nearby provinces such as Rayong, Supanburi, Nonthaburi, and Phatumthanee. However, due to COVID-19 situation, these tourist groups have stopped traveling to visit and only a few can be seen during the relief control policy of Thai government.

From the aforementioned problem, the study and model development of supply chain agility: "An Adaptation Perspective on the Effect of the Covid-19 Pandemic on Tourism Entrepreneurs at Lad-Etan Island, Nakhon Pathom Province in Thailand: (SCA-Lad-Etan Island Model)" can potentially help involving people and tourism businesses to alleviate the impacts and survive during this severe situation.

2. Research's objective

1. To find the appropriate measures of supply chain agility for tourism entrepreneurs from the effect of the COVID-19 pandemic.

2. To develop a model of supply chain agility during the spread of the COVID-19 pandemic for tourism entrepreneurs at Lad-Etan Island, Nakhon Pathom Province in Thailand: (SCA-Lad-Etan Island Model).

3. To study the influence of supply agility (SCA) which has the positive direct and indirect impacts to firms' performance (FP).

3. Hypotheses

H_1 : Supply chain agility (SCA) has positive impact on firms' performance (FP).

H_2 : Supply chain agility (SCA) has indirect

impacts to firms' performance (FP).

4. Literature review

4.1 Agility

From literature review regarding agility, several researchers give its definition as summarized in table 1.

Table 1. The definition of agility

Researchers	Definition
Wieland (2013)	Agility is the defensive ability that served several purposes such as communication with suppliers or purchasers, business continuity planning, the visibility of products assortment planning, make-to-order, or postponement.
Gligor and Holcomb (2012)	Agility is the ability for change management, increasing customers responsiveness that is the respective concept necessary for firms' competency improvement through marketing knowledge, making profit opportunity in a fluctuate environment, hence agility is an important capability for survival.
Carvalho et al. (2011)	Agility is the supply chain with speed that focused on quick responsiveness to market changes.
Charles et al. (2010)	Supply chain agility is capability of quick responsiveness for abrupt changes of demand and supply or business environment. Agility is further development derived from flexibility, responsiveness, and effectiveness of a supply chain.
Li et al. (2009)	Organization agility are the results from integration of readiness for changing in the supply chain in term of challenge and opportunity by being flexible when using resources capability both offensively and defensively in proper time.

Summarized from literature review, we can define agility as the capability of quick responsiveness as customer demand fluctuates in term of service, quality, price, quantity, and variety or peculiar products. It needs collaboration by both internal business units within the firm and external from organizations in the supply chain network. Resulting in designing challenge strategy dimensions to seize profit by making opportunity, achieving competitive advantages, and increasing customer value perception. However, agility's concept is suitable only for the implementation of short life cycle products with high diversity and high demand fluctuation (Fisher, 1997). Some examples of implementation of this agility concept are such as the textile in-

dustry in fashion sector that needs quick responsiveness to market and customer demand (Watchravesringkan et al., 2010); food business with short product life cycle (Tiemann et al., 2012); industrial sector in the United State during economic depression to promote sustainable supply chain establishment (Xia & Tang, 2011); port management strategy for achieving management and employees, costs and expenses, and time effectiveness (Paixão & Marlow, 2003); new products designed to meet customers demand (Vinodh & Chintha, 2011); whereas a few researchers used the agility concept for procurement (Khan K et al., 2009). The components of the agility concept are illustrated in figure 1.



Figure 1. Components of agility concept

4.2 Supply Chain Agility

Supply chain is an outside organization network involving people that work and collaborate in generating products and services. It consists of several activities from procurement; research and development of new products; warehouse storage; products distribution; marketing and selling; and financing (Natpatsaya Setthachotsombut, 2017). To pursue supply chain excellence, it requires four major capabilities (4Rs) which are 1) responsiveness 2) reliability 3)

resilience, and 4) relationships (Martin, 2011; 2016). However, several researchers suggested that as well as those four capabilities, supply chain agility is also necessary where as previously mentioned it is defined as the ability to respond quickly to highly fluctuated customers demand located at the downstream supply chain.

4.3 Tourism Supply Chain

Tourism supply chain includes two involving main parts, which are 1) tourism's demand related to tourists and 2) tourism's supply related to tourism entrepreneurs. Tourism supply chain is a service business that integrates selling of products and related services to attract money and promote tourists' expenditure during their trip (Natpatsaya Setthachotsombut & Gritsada Sua-iam, 2020). However, the number of tourists, changing in tourists' behavior, and dynamic tourists' demand can immensely affect both positive and negative directions to tourism entrepreneurs.

4.4 Tourism at Lad-Etan Island, Nakhon Pathom Province in Thailand

The Lad-Etan Island is nearby the Tha Chin River and located at Rai Khing sub-district, Sam Phran District, Nakhon Pathom Province, Thailand. Due to its adjacency to Bangkok at only 40 kilometer away, it is a tourist attraction for people resided in Bangkok who have a few vacation days. They can easily come to the island instead of going to the southern part of Thailand, which can take several days to reach. Additionally, the Lad-Etan Island is the community role model in implementing sufficiency economy philosophy of King Rama IX to promote strong and sustainable tourism by establishing partnership among stakeholders within tourism sector to provide agricultural and cultural tourism with full-service of comfort at an economical price.

There are many tourist attractions around Lad-Etan Island such as Raikhing temple, butterfly canal way of life museum and others. More details of these tourist attractions in descending order of popularity and their atmosphere are illustrated in table 2 and figure 2, respectively. Furthermore, there are stakeholders involved in tourist attractions directly and indirectly. For the directly involved, there are seven groups of entrepreneurs, which are homestay, ferries and scenic cruises, outside shopping mall markets, temples, food and beverage selling, shopping malls and outlets, and fruit/vegetable/flower gardens. For the indirectly involved, there are only two groups of entrepreneurs, which

are tourists themselves and hotel booking or Booking.com.
website representatives such as Agoda.com

Table 2. Tourists attractions

No.	Tourist attractions along popular tourist route
1	Raikhing temple
2	Madi at Lad-Etan
3	Butterfly Canal community way of life museum
4	Bang-tei garden homestay
5	Song Khanong temple
6	Rai San Ruk (organic planting learning center)
7	Beautiful scenic cruise with delicious food and beverages along the Tha Chin River

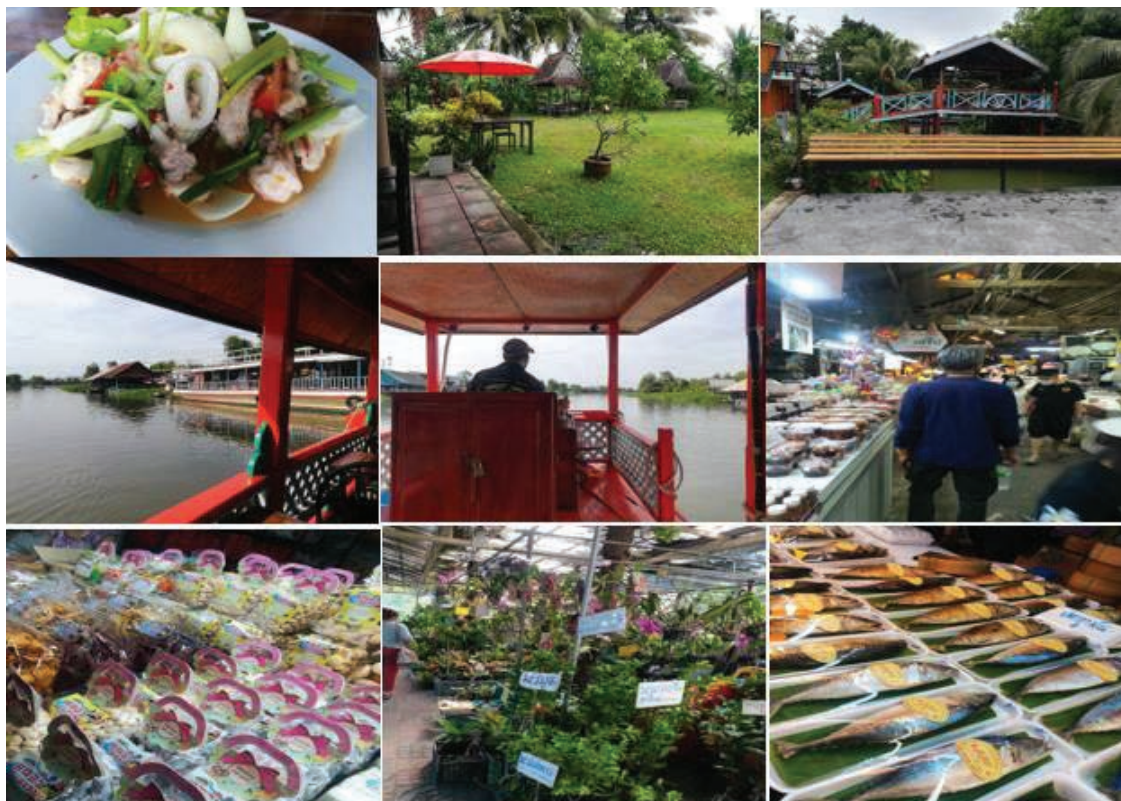


Figure 2. Tourism atmosphere at Lad-Etan Island

4.5 The Effect of the COVID-19 Pandemic 2019 on Tourism in Thailand

The COVID-19 pandemic started to effect Thailand's tourism by the end of December 2019. Since then, foreign tourism has declined dramatically due to pandemic control measures implemented at home and abroad. As a result, several international airlines have had to seriously stop their flights worldwide (Bangkokbiznews, 2020). We can clearly see that it has caused severe damages not only to tourism sectors but also to other business sectors especially consumer goods industry, import-export, and international freight shipping (K-Research, 2020).

Unfortunately, these negative impacts intensify Thailand economic degradation. For instance, Thailand's tourism targeted of 3.38 trillion Baht will not be achieved (Bangkokbiznews, 2020) in fact it will lead to heavy financial losses to entrepreneurs throughout the tourism supply chain. To survive the extraordinary pandemic, they will have to reduce their operating costs by laying off several employees or even temporarily close their businesses. This might solve the problems at hand, but the right ways to tackle this difficult situations suggested by several researchers is to promote supply chain agility in with the long-term outlook. Since the supply chain agility can be utilized to quickly response to abrupt changes in Thailand's current tourism situation.

5. Methodology

5.1 Research method

This research implemented mixed method between quantitative and qualitative. For the quantitative method, we distributed questionnaires to collect a large amount of data while the qualitative method we conducted in-depth interview with experts in this arena.

5.2 Population and sample

The population in this research includes all tourism stakeholders at Lad-Etan Island, Nakhon Pathom Province in Thailand. Therefore, the population is large, not specifically defined, and derived from several stakeholder groups namely; 1) hotels, homestays, 2) restaurants, 3) transportation, cross-river boats, sightseeing boats, 4) shops, gift shops, souvenir shops, 5) merchants of riverside market, 6) tourist attractions, fruit and agricultural gardens, 7) tourists and related people (such as temple), 8) tour companies, and 9) tourist information units around the area. The research sample consists of two types based on the quantitative and qualitative methods. For the quantitative method, we randomly selected 400 people to answer the questionnaires we obtained the appropriate sample size from Taro Yamane (1967) table. In addition, for the qualitative method, 12 people were purposively sampling for in-depth interviewing.

5.3 Data collection

For quantitative method, we collected data from distributed questionnaires from

ourselves at Lad-Etan Island and for qualitative method where we conducted in-depth interview for about 30 minutes per person. The research implements developed questionnaire that examined by three experts, which are one academic and two tourism experts. The questionnaire's content validity is verified and obtained IOC value is 0.94.

For quantitative analysis, we implemented the descriptive statistics, path analysis, and structural equation modeling (SEM). While for qualitative analysis, we recorded and verified the obtained in-depth interview data in term of consistency and

matching with questionnaire data.

6. Results

The results of the exploratory factor analysis shows that the SCA-Lad-Etan Island model can be divided into 2 main components, which are supply chain agility (SCA) and firms' performance (FP). Then, each question of both components are sorted based on factor loading values. The first component (SCA) includes sixteen factors while the second component (FP) includes four factors arranged in descending order of factor loading values as shown in table 3 and table 4

Table 3. Exploratory factor analysis results

Question lists	Components	
	1: SCA	2: FP
Personnel	0.763	
Working team	0.748	
Relationship	0.646	
Communication	0.635	
Integration	0.774	
Know-how	0.634	
Planning	0.805	
Reorganization	0.640	
Demand management capability	0.676	
Supply management capability	0.759	
Anticipation	0.608	
Adaptability	0.471	
Visibility	0.488	
Purchasing order flexibility	0.550	
Distribution	0.724	

Table 3. Exploratory factor analysis results (Cont.)

Question lists	Components	
	1: SCA	2: FP
Customer orders processing capability	0.534	
Delivery reliability		0.622
Expenses or reduced costs		0.528
Time		0.517
Flexibility and responsiveness		0.418

Table 4. Path analysis result of SCA-Lad-Etan Island Model

Model	SCA						FP				
	TE	DE	IE	TE	IE	DE					
SCA	-0.77* (0.11)	- -	-0.77* (0.11)	- -	- -	- -					
FP	0.13 (0.16)	0.26* (0.11)	0.32 (0.15)	- -	- -	- -					
Chi-Square Statistics = 257.29, df = 220, P-Value = 0.06, GFI = 0.98, AGFI = 0.97, RMR = 0.01											
Variables	OR	_LO	SE	IS	FP01	FP02	FP03	FP04	FP05	FP06	FP07
Validity	0.43	0.45	0.43	0.40	0.38	0.29	0.31	0.20	0.35	0.43	0.38
SEM.	SCA	FP									
R Square	0.14	0.11									
Latent variables	SCA	FP									
SCA	1.000										
FP	-0.059*	1.000									

Remark * P-Value < .05 ** P-Value < .01

From table 3, the SCA question components ranked from first to third places are Planning 0.805, Integration 0.774 and Personnel 0.763. This means that the entrepreneurs from the 9 tourism groups need to first have effective planning. Then those

planning should include paring, integration, and collaboration in economic aspect such as homestays and nearby restaurants, homestays and cross-river boat services, homestays and sightseeing boat services. Also, the HR management includes reducing or increasing

personnel to achieve the highest cost effectiveness.

Furthermore, from table 4, solely improving of SCA might not be the best solution under COVID-19 situation due to both tourism and economic sectors have been severely damaged. As one can see from our study (based on only SCA improvement), FP can improve only 0.32 which less than 50%. Therefore, the entrepreneurs have to implement several strategies coping with SCA improvement to face these critical situations.

7. Discussion and Conclusions

7.1 Building supply chain agility model based on adaptation perspective on the effect of the COVID-19 outbreak on tourism entrepreneurs at Lad-Etan Island, Nakhon Pathom Province in Thailand.

This research conducted a survey on the aforementioned nine groups of entrepreneurs. We randomly selected four hundred people to answer the questionnaires and twelve people are purposive sampling for in-depth interviewing. The result shows that to build supply chain agility requires four capabilities dimensions which are logistics (SCA-LO), organization (SCA-OR), sensitivity (SCA-SE), and information system (SCA-IS).

Factor loading values of all related variables of supply chain agility (SCA) model are explained as follows.

1. Logistics (SCA_LO) has factor loading value equal to 0.99 and covariance with agility at 45%. It consists of two factors SCA_LO01

and SCA_LO02. Their details are explained as follows:

- SCA_LO01: Demand management capabilities ($\bar{X}=3.83$) consist of
 - (1) The capability to manage tourism demand flow promptly.
 - (2) The capability to manage tourists' information flow both inbound and outbound.
 - (3) The capability for prompt transferring routes or transportation modes of merchandises or tourists handling.
 - (4) The capability to relocate merchandises, services, or tourists promptly.

- SCA_LO02: Supply chain management capabilities ($\bar{X}=3.57$) consist of
 - (1) The capability to manage expenses in supply chain (tourism services) effectively at the lowest costs.
 - (2) The capability to manage supply chain operations under COVID-19 pandemic situation with the lowest mistakes which consistent to that of Wieland (2013)

2. Organization has factor loading value equal to 0.80 and covariance with agility at 43%. It consists of eight factors denoted as SCA_OR01 to SCA_OR08 which consistent to that of Gligor and Holcomb (2012). Their details are explained as follows:

- SCA_OR01: Personnel ($\bar{X}=3.72$) consists of
 - (1) Human resource development planning availability.
 - (2) Promote multitasking skills.
 - (3) Promote creative problem solving.
 - (4) New and old employee training availability.

- (5) Clear job responsibility and description.
- (6) Focus on personal responsibility.
- (7) Keep employees' morale high.
- (8) Build employees' attachment and connection.
- (9) Instill employees' business ethics.

• SCA_OR02: Working team (\bar{X} =3.75) consists of

- (1) Focus on training and evaluation of working teams for team members' continuous learning.
- (2) Quickly appoint a skilled manager to fill any vacant position.
- (3) Aid and support working team to operate under the effect of COVID-19 pandemic situation.
- (4) Provide suitable working facilities and environment.
- (5) Implement suitable performance appraisal system.
- (6) Pay attention to each team member's responsibility.
- (7) Maintain a strong team working culture.

• SCA_OR03: Relationship (\bar{X} =3.75) consists of

- (1) Strong relationships with small customers/tourists group and using collaboration tourism management among stakeholders.
- (2) Continuously contact and negotiate with key tourist providing brokers.
- (3) Build good and direct relationship with all customers.
- (4) Build in-depth relationships with business partners for sustainability purposes.

- (5) Promote the good relationship building among organizations within the firm.

• SCA_OR04: Communication (\bar{X} =3.69) consists of

- (1) Effective communication systems both internal and external.
- (2) Communication that promotes relationship-building channels.
- (3) Communication that increases marketing effectiveness.
- (4) New employee can promptly communicate with correct information.

• SCA_OR05: Integration (\bar{X} =3.83) consists of

- (1) Resources integration.
- (2) Working together integration.
- (3) Joint decision-making integration.
- (4) Delivery of tourisms' products or services integration.

• SCA_OR06: Knowledge (\bar{X} =4.03) consists of

- (1) Utilize data or information technology to solve problems effectively.
- (2) Utilize marketing knowledge to increase firm's income.
- (3) Utilize knowledge to manage business successfully.

• SCA_OR07: Planning (\bar{X} =3.70) consists of

- (1) Planning in all time durations (short/medium/long).
- (2) Planning for selling tourism products or services for the high profit brand.
- (3) Planning to expand services for extra

income.

(4) Planning for suitable employee job scheduling.

(5) Collaborative working planning.

(6) Planning for risk management.

(7) Planning for employee security.

(8) Emergency planning to restore the business.

• SCA_OR08: Reorganization (\bar{X} =3.61)

consist of

(1) High mobility organization structure.

(2) Develop into a virtual organization to work with dynamic partners.

(3) Classify the organization structure according to business segments.

(4) Manage separately by using different strategies.

(5) Adjust the people or processes.

(6) Apply the benefit of information technology.

(7) Apply the flexibility of information technology.

(8) An organizational structure that supports highly skilled employees.

3. Sensitivity (SCA_SE) has factor loading value equal 0.65 covariance with agility at 43%. It consists of five factors denoted as SCA_SE01 to SCA_SE05. Their details are explained as follows:

• SCA_SE01: Anticipation (\bar{X} =3.50)

consist of

(1) Readiness preparing in advance.

(2) Identifying economic warning threat signals beforehand.

(3) Accurately and effectively demand forecasting.

(4) Prioritizing risk factors beforehand.

(5) Making future contracts that are related to business operations.

• SCA_SE02: Adaptability (\bar{X} =3.89)

consist of

(1) Operations adaptability to respond to challenge or opportunity.

(2) Increasing products releasing channels.

(3) Expanding and creating new product or service types.

(4) Adaptability to product design changes.

(5) Adaptability to different facilities utilization scenario.

(6) Adaptability to using innovative technology to improve working processes and lead times reduction.

(7) Take advantages of changing market.

• SCA_SE03: Visibility (\bar{X} =3.94) consist

of

(1) Clear firm's vision.

(2) Personal visibility.

(3) Assets visibility.

(4) Operation and environmental directions visibility.

(5) Information sharing visibility.

(6) Decision making visibility.

(7) Business data collection visibility.

• SCA_SE04: Customer orders fulfillment flexibility (\bar{X} =3.88)

(1) Customer orders fulfillment flexibility

(2) Fast outcomes delivery.

(3) Flexible selling channels.

(4) Diversified products inventory at the central warehouse.

(5) Frequent safety stock calculation.

(6) Finish goods assembly postponement until due date.

(7) Fast customer orders transfer to other sellers.

• SCA_SE05 Distribution (\bar{X} =3.52) consist of

- (1) Wide assets diversification from center.
- (2) Spreading of decision-making responsibilities.
- (3) Markets diversification.
- (4) Facilities, equipment, and labor distribution.
- (5) Executive management diversification.
- (6) Distribution of products through the branch stores, or send the products directly to the entrepreneur
- (7) Decentralization of power of the manufacturers' network or suppliers

4. Information system (SCA_IS) has factor loading value equal 0.63 covariance with agility at 40%. It consists of a factor denoted as SCA_IS04. Their details are explained as follows:

• SCA_IS04: customer orders fulfillment (\bar{X} = 4.13) consist of

- (1) Increase customer orders fulfillment rate.
- (2) Increase customers' requirement satisfaction rate.

7.2 The development of SCA-Lad-Etan Island Model is illustrated in figure 3. The effect of supply chain agility on firms' performance can be summarized as follows:

The significant factors according to firms' performance (FP) are

1. Time (FP06) has factor loading value

equal 0.88 covariance with firms' performance at 43%. The supply chain agility can improve time performance such as

- (1) Faster work completion.
- (2) Lead time reduction.
- (3) Waiting time reduction of customers or dealers for purchasing products.

2. Flexibility or Responsiveness (FP07) has factor loading value equal 0.71 covariance with firm performance at 38%. The supply chain agility can improve flexibility or responsiveness performance such as

- (1) Better flexibility or responsiveness in working.
- (2) Increase flexibility level that can respond immediately.

3. Delivery reliability (FP01) has factor loading value equal 0.71 covariance with firms' performance at 38%. The supply chain agility can improve delivery reliability such as

- (1) Increase customers' trust in products delivery.
- (2) Delivery without lost products.
- (3) Delivery without wrong products.
- (4) Delivery without damaged products.
- (5) Delivery without defective products.

4. Expenses or Costs reduction (FP05) has factor loading value equal 0.59 covariance with firms' performance at 35%. The supply chain agility can improve delivery reliability such as

- (1) Operating costs reduction.
- (2) Effective budget management and control.
- (3) Service costs reduction.

However, the result shows that supply chain agility (SCA) has no direct positive effect on firms' performance with direct effect (DE) weight value of 0.26; also, it has no indirect positive effect with indirect effect (IE) weight value of 0.32. Hence, it is possible that implementation of the developed SCA-Lad-

Etan Island Model can lead to better firms' performance (FP) that stems from both direct and indirect positive effects of logistics (SCA_LO), organization (SCA_OR), sensitivity (SCA_SE) and information system (SCA_IS) factors without passing through supply chain agility (SCA).

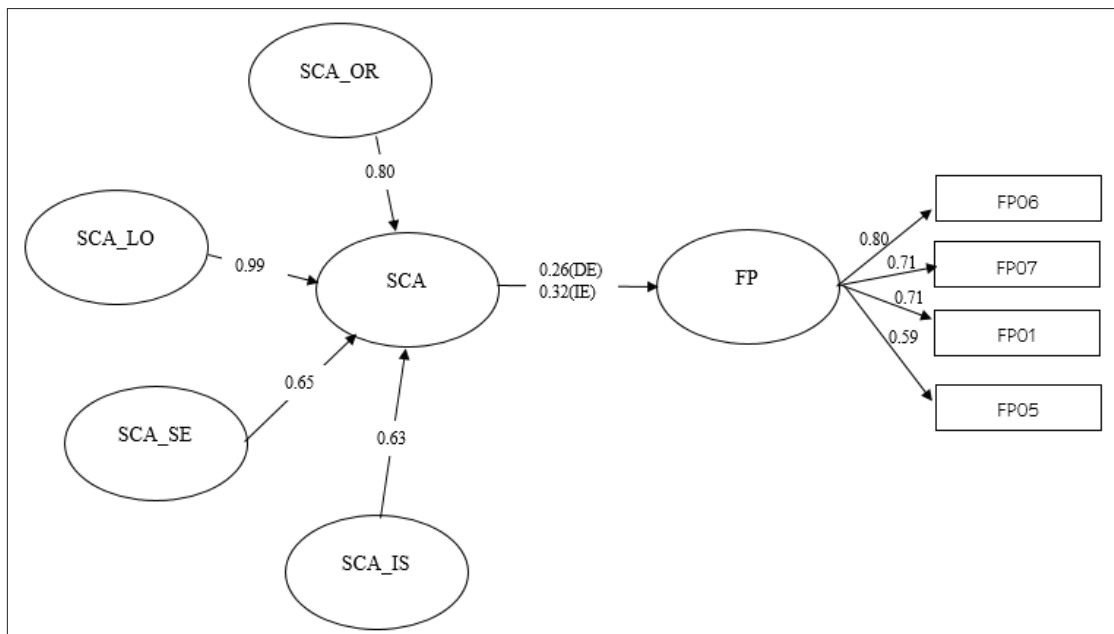


Figure 3. SCA-Lad Etan Island Model

8. Recommendation

8.1 Recommendations for implementing

The tourism entrepreneurs at Lad-Etan Island include 1) hotels, homestays, 2) restaurants, 3) transportation, cross-river boats, sightseeing boats, 4) shops, gift shops, souvenir shops, 5) merchants of riverside market, 6) tourist attractions, fruit and agricultural gardens, 7) tourists and related people (such as temple), 8) tour companies,

and 9) tourist information units around the area. They should utilize supply chain agility to survive COVID-19. Although it has indirect positive effect on firm's performance but its sub-components' capabilities can aid entrepreneurs to survive COVID-19 severe negative effects. These critical capabilities (consisted of Organization, Logistics, Sensitivity, and Information System) are summarized as follows:

- Managing tourism supply chain flows-continuously, responsively, and seamlessly.
- Managing of the costs in the supply-chain, targeting the lowest possible total costs.
- Managing operations of tourism supply chain effectively to minimize mistakes for responding to fluctuated demand during COVID-19 outbreak situation.
- Promoting creative problem solving.
- Aiding working teams to be able to operate efficiently.
- Building strong relationships with small customers/tourists group and using collaboration tourism management among stakeholders.
- Planning to expand and create newproducts or service types to gain extra income.
- Planning of suitable and flexible job scheduling.
- Collaborative working planning.
- Flexibility and organization's structure.
- Using flexible information technology.
- Preparing in advance to cope with uncertain situations.
- Accurate demand forecasting.
- Operations adaptability to respond to challenge or opportunity.
- Increasing products releasing channels.
- Expanding and creating new products or service types.

8.2 Future research direction

The future research should study the influence of logistics (SCA_LO), organization (SCA_OR), sensitivity (SCA_SE) and information system on direct and indirect effect of firm's performance (FP).

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