

Analysis of Tourism Supply Chain Management after The Eruption of Mount Agung, Bali

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Abstract—Tourism industry depends on the information. The industry also has a high product complexity, demand uncertainty, and very dynamic. This research aims to analyze the complexity and dynamics of tourism supply chain management (TSCM) after natural disaster crisis in a tourism destination. The study was located in Ubud, Bali the famous village tourism area that lures a significant number of international tourists. It analyzed how TSCM worked after the tremendous eruption of the highest mountain in Bali, Mount Agung. This article described seven keys of TSCM which are analyze the situation in Ubud after the eruption. The seven keys are demand management, two-party relationships, supply management, inventory management, product development, coordination of tourism supply chain and information technology. This research is conducted by analyzing data with Fuzzy Logic Analysis. The result shows that several factors need to be improved, such as demand management, cooperation between tourism business and related industries, the relationship between local government and tourism supplier. The information network shows good progress. However, the competence of human resources who work in the field of information and technology still needs some improvements.

Keywords—*tourism supply; chain management; fuzzy logic.*

I. INTRODUCTION

Supply Chain Management (SCM) is a set of approaches for efficiently integrating suppliers, companies, warehouses, distributors, retailers in producing and distributing products at the right quantity, location and time, as well as minimizing all costs and meeting service level needs. Of the many studies on SCM, there are many research results focusing on the manufacturing industry and very little attention is given to the service industry sector.

Over the past two decades, the tourism industry has grown rapidly. The highly competitive environment of the tourism industry has made tourism companies look for ways to increase their competitive advantage. One of the major developments in the world of tourism today is the development of information technology (IT). It triggered the development of new business formats in the field of tourism, such as Tourism Electronics (e-Tourism). The development of integrated information,

communication, and technology, currently has a significant influence on the development of supply chain management in manufacturing and tourism industry. Consumers could easily connect with various suppliers by using applications on their personal computers or mobile devices. They also can compare prices because information transparency is very high on the websites.

Tourists need different products that are supplied by separate business entities, such as accommodation, transportation, and tourists attractions during their travel. Therefore, the characteristics are different from those in the manufacturing industry. [1] mentioned six characteristics of tourism, namely highly-coordinated bundled products; perishability; intensive-information; the complex of multiple product's entities; uncertain demand; tight competition and dynamics.

Due to those characteristics, [2] developed seven areas to be considered in the tourism supply chain management (TSCM), namely demand management, two-party relationship, supply management, inventory management, product development, tourism supply chain coordinators, and information technology. Furthermore, if the destination organizer or management develops those areas well, the visitor's satisfaction is likely to increase. An effective integrated supply chain management is needed to increase its competitive advantage. [3] researched supply chain readiness for resilience after the disaster. Their study implied that strong supply chain management could bring back speed recovery from the crisis, such as natural disaster.

Problem Formulation

At present, the Gianyar Regency Government through the regional tourism office is actively managing the tourism industry along with the increase in tourist visits to Ubud. The increasing number of tourists illustrates the attractiveness of tourists industry in this region. More tourism businesses enter the region lead to higher complexity in managing the tourism supply chain, especially when there are affected by the crisis.

A natural disaster is a form of crisis that also becomes a threat to tourism destination [4]. The eruption of Mount Agung in Bali has affected tourism activities at Ubud.

Therefore, there are two research questions to explore this phenomenon, as follow:

1. How to determine the structure of Tourism Supply Chain Management (TSCM) in Ubud?
2. What are the efforts of tourism supply chain management in maintaining the existence of the tourism industry in Ubud after the Mount Agung eruption?

II. LITERATURE REVIEW

A. Supply Chain Management.

Supply chain management (SCM) is the integration of procurement of materials and services, conversion into semi-finished goods and end products, and delivery to customers [5]. In the supply chain there are usually three types of flows that must be managed [6]:

1. The flow of goods/material flowing from upstream to downstream
2. Financial flow, which flows from downstream to upstream.
3. Information flow, which flows from upstream to downstream or vice versa.

Moreover, in the supply chain, there are several main players who are companies that have the same interests namely the suppliers, the manufacturers, the distributor, the retail outlet, and the customers.

B. Information Sharing

Information is used as a basis in making decisions that must be obtained at the right time, quickly, and of good quality. Information is the basis for implementing the supply chain process.

Information must have several characteristics to be useful in making supply chain decisions, namely:

- a. Accurate. To make good decisions, information must describe actual and reliable conditions.
- b. Right. Consider what information is suitable and needed by the company.
- c. Accessible when needed. To be used when needed information must be accessible properly and correctly so that it can assist in making decisions.

The success of the supply chain is very dependent on the information system; with the existence of information business partners in the supply chain can be taken into account.

Information or distorted information at each level of the supply chain from the bottom up could cause several important problems, including 1) Excessive inventory, 2) Loss of income, 3) Decreased level of customer satisfaction, 4) Ineffective deliveries, 5) Errors in production scheduling and 6) Inefficient use of resources

Information sharing is the intensity and capacity of companies in their interactions to share information with partners about joint business strategies. Information sharing also enables supply chain members to obtain, maintain, and convey information needed to ensure effective decision making and is a factor that can strengthen the elements of collaboration as a whole. Therefore industrial congestion can be reduced by information sharing.

C. Tourism Supply Chain Management (TSCM)

Zhang et al. [2] developed some considerations on the tourism supply chain (TSC) that consists of two tiers. The first tier is the direct tourism supply chain, namely: suppliers, such as hotels, transportations, tourist attractions; intermediary, such as the tour operator, event organizers, and tourists travel bureau; and the customer or tourists. The second tier is the upstream supplier that provides products and services to the direct tourism business, for instance, the food and beverage industry, souvenir handicraft maker, energy and security services. This explanation is described in the diagram, as follow.

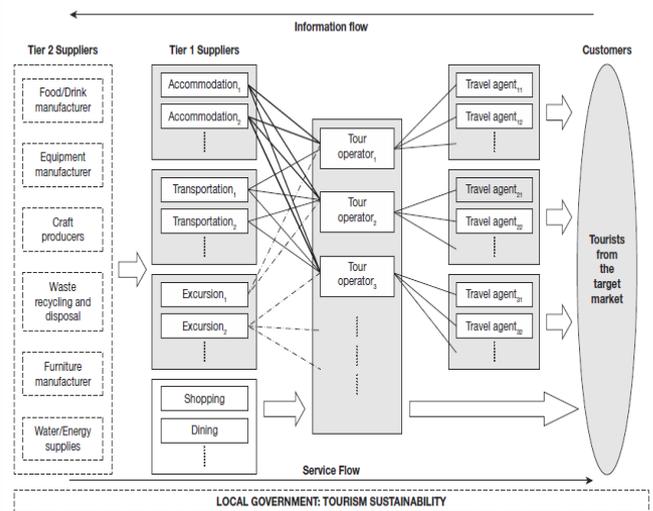


Fig. 1. Local Government Tourism Sustainability
Source: Zhang et al. [2]

Management that works well between each level of the supply chain makes the flow of TSC run well and is expected to be cost efficient and foster customer satisfaction.

Characteristics of the Tourism Industry and TSCM keys

The tourism industry has some different characteristics from the manufacturing industry; there are six characteristics of tourism as follows [1]:

1. Intensive Coordination, tourism is an intensive coordination industry where different products/services (transportation, accommodation, etc.) are bundled together to form a tourism end product.
2. Perishable, tourism as a service cannot be stored for future use; tourism as a product is Perishable.
3. Information Intensive, to consume tourism products, tourists need to travel to the destination where tourism products are produced. Tourism products usually cannot be checked before a purchase is made, which means that the sale of tourism products is highly dependent on the presentation and interpretation of the product. Therefore, the tourism industry is very information-intensive or industry-dependent information
4. Product Complexity, tourism products are complex. Usually, they are heterogeneous and plural, which consists of many different service components such as accommodation, transportation, travelling, dining and shopping.
5. Demand Uncertainty, the tourism industry often faces a high demand for uncertainty.
6. Dynamics, intensive competition among service providers.

[2] pointed out the characteristics of the tourism industry, identifying seven key tourism supply chain management (TSCM): 1. Demand Management, 2. Two Party Relationships, 3. Supply Management, 4. Inventory Management, 5. Product Development, 6. Coordination of Tourism Supply Chain and 7. Information Technology

III. RESEARCH METHODS

Additionally, to analyze the complex TSCM, other methodology, such as fuzzy logic, is likely to be applied in the current research. Fuzzy Logic provides a simple way to describe definite conclusions from ambiguous, vague, or incorrect information. In a way, fuzzy logic resembles decision making in humans with their ability to work from data interpreted and find the right solution. Fuzzy logic is a multivalued logic that can define values between conventional circumstances such as yes or no, true or false, black or white, and so on. Fuzzy reasoning provides a way to understand the performance of a system by assessing the system's input and output from observations.

IV. DISCUSSION

A. *Tourism Supply Chain Structure in Ubud*

The parts of Ubud's tourism supply chain (TSC) are as follow:

1. Upstream Supply Chain

The upstream supply chain includes the activities of a supplier company, such as manufacturers, assemblers with the direct tourism business. The upstream industry is organized by public and private sectors.

2. Direct Tourism Supply Chain

The part of the internal supply chain includes all in-house processes used in transforming inputs from upstream suppliers into the direct tourism business output. There is time extension in this process, and the main concerns in this process are production management, service management and service inventory control.

3. Downstream supply chain

The downstream supply chain includes all activities involving product delivery to consumers in these case tourists. In the downstream supply chain, attention is directed to the distribution of services, information & transportation.

Group visitors tend to use services from the intermediary, while the individual visitors prefer to travel without the intermediary services. Individual visitors rely on tourism information, communication, and technology for arranging their travel.

B. *Fuzzy Analysis Research Result*

From the results of research conducted on respondents of tourism actors in Ubud, analysis and discussion were obtained as below:

1. From the results of the research on the Demand Management variable, the average index interpretation was 79.6%, and the fuzzy logic approach obtained a firm value of 66.8. So it can be concluded that demand management is sufficiently being applied by tourism actors in Ubud. This activity needs to be improved.
2. From the results of the study on variables Cooperation relations, the average index interpretation is 79% and from the fuzzy logic approach firm values is 80.6 It implies that the cooperative relationship between tourism actors in Ubud is sufficiently managed. The indicators of vertical cooperation and horizontal cooperation still need to be improved.
3. From the results on supply management variables, the average index interpretation of 85% and the fuzzy logic approach obtained firm values 83.1. This numbers mead that supply management has been well implemented by tourism actors in Ubud. However, local government assistance to tourism suppliers is still poorly managed.
4. From the results of the research on inventory management variables, the average index interpretation is 84%, and from the fuzzy logic approach, there is a firm value of 83.1. This result shows that the management of tourism supplies among tourism actors in Ubud has been well implemented by tourism actors. However, on local government support for the availability of tourism supplies is still poorly managed.
5. From the results of research on Tourism Product Development variables, the average index interpretation is 87.6%, and from the fuzzy logic approach, there is a firm value of 84.7. This factor gets the highest value, that shows

the tourism product development in Ubud has been well implemented by the tourism actors.

6. From the results of the research on variables between supply chain coordination, the average index interpretation is 82%, and from the fuzzy logic approach there is a firm value 83.4, it can be concluded that the coordination between tourism supply chains has been well implemented by tourism actors.
7. From the results of the research on information technology variables, the average index interpretation was 82%, and from the fuzzy logic, approach obtained a firm value of 82.8. This means that tourism Information Technology has been well implemented by tourism actors. However, the indicators of IT human resources are still inadequate.

From the results of the overall Tourism Supply Chain research, the clear value of defuzzification is 83.5, it can be concluded that TSC management has been well managed by tourism actors in Ubud, but it should be noted that the value is categorized on good criteria. Good criteria range from 80 to a value of 100.

Based on this research, there are several things that should be improved, namely:

1. Demand Planning management and service order are still poorly managed.
2. The relationship of cooperation between similar tourism business actors (horizontal) and the collaboration of different types of tourism business actors (vertical) needs to be improved and managed better.
3. The development of the local government towards tourism suppliers is still poorly managed.
4. Local government support for the availability of tourism supplies is still poorly managed.
5. The progress of information networks, hardware and software information technology has been well implemented, only human resources who are competent in the field of information technology that supports tourism are still lacking.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

The Tourism Supply Chain structure in Ubud, which is presented in this study to work well, can be managed with seven key tourism supply chain management (TSCM) efforts.

Overall, the results of the seven defences of tourism supply chain management (TSCM) scored 83.5; this shows that that the TSC management in Ubud was good.

B. Suggestion

For tourism business actors

There are some suggestions for better improvement as follow.

1. Empowerment and improvement of human resources competency in the field of information technology, to capture the advancement opportunities in the IT field which are currently developing rapidly.
2. Demand management to get the main attention regarding indications of tourism marketing, planning of tourist visits, and tourist order services.
3. Further enhancement on cooperative relations in the field of tourism with other tourism components both with similar and different businesses.

For the Tourism Office in Ubud, Bali

- From the description of the typical TSC structure in this study, it is expected that the local government through the tourism agency can provide ongoing support from the upstream to downstream chains in the tourism supply chain in Ubud.
- Give more attention to fostering tourism suppliers or suppliers.

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