

INTEGRATING LEAN MANAGEMENT INTO COMMUNITY-BASED TOURISM: ENHANCING EFFICIENCY IN TOURISM SUPPLY CHAINS THROUGH VALUE STREAM MAPPING CONCEPT

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ABSTRACT

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This study aimed to identify waste within the community-based tourism (CBT) management chain and enhance the efficiency of the CBT activities' supply chain by employing the value stream mapping (VSM) concept. Through a case study of a CBT destination in Kok Sathon, Thailand, a mixed-method research approach was utilized, combining qualitative and quantitative methods. The study incorporated a literature review, field surveys, interviews with 35 key informants, and questionnaires administered to 400 tourists. The findings reveal that waste in the CBT management process manifested in nine categories: non-participation/non-community involvement; lack of identity/storytelling; unclear communication; overproduction/over-processing; waiting/delay; transportation/motion; non-organization and management; defects; and tourism marketing. Following the implementation of improvements, a reduction in staff activities was observed by 33.33% and service process time by 5.61%. The research not only provides empirical evidence of waste in CBT supply chain management but also demonstrates the impact of applying lean principles to address inefficiencies. Furthermore, it offers insights into optimizing tourism resources in CBT operations and serves as a guide for enhancing efficiency in service organizations. This work introduces a new framework that challenges traditional compartmentalized problem-solving methods in tourism and emphasizes the importance of every step in the process—from inception to conclusion—to enhance understanding of the root causes of issues and facilitate necessary changes. These reductions in waste are directly aligned with the values desired by tourists, indicating a successful alignment of operational improvements with tourist expectations.

Keywords: Lean principles; community-based tourism; tourism supply chains; value stream mapping; waste of CBT

1. INTRODUCTION

The Kok Sathon sub-district in Dansai, Loei, has garnered attention for its effective management of community-based tourism (CBT) at Phu Lom Lo, situated within the Phu Hin Rong Kla National Park at the juncture of Phitsanulok, Phetchabun, and Loei provinces. Particularly during the winter months from late December to mid-February, this location attracts numerous visitors eager to witness the spectacular blooms of the Dok Nang Phaya Sua Krong flower, colloquially known as the "Thai sakura," which spans approximately 480 acres. In 2010, the Kok Sathon Community-Based Tourism Association (KTA) was acclaimed as a leader in Thailand's tourism sector, recognized for its significant potential and competitiveness in both the domestic and international markets (Designated Areas for Sustainable Tourism Administration, 2021). This initiative leverages the local community's efforts to cater to urbanites seeking serene experiences amid the scenic beauty of the Thai sakura and the region's cool climate, a trend that has gained momentum in the post-COVID-19 era, with an increasing preference for nature-based and community-driven tourism aimed at enhancing health and well-being (Surawattananon et al., 2021). However, the surge in tourist numbers has outpaced the capacity of existing community-led tourism vehicles, limited to only 70, leading to extended waiting times for transportation and challenges in accessing reliable tourism information. Additionally, the unpredictable weather patterns that affect the flowering and dispersion of the blooms each year pose further planning challenges for tourists, potentially causing them to miss the peak blooming periods (K. Niyom, personal communication, September 9, 2020).

The fluctuating travel restrictions and the uncertainties triggered by the COVID-19 pandemic posed considerable challenges to the site's tourism attractions (Rahman et al., 2021). In response, both the community and tourism operators have encountered significant operational disruptions. To sustain CBT in the area, there is a pressing need to restructure and adapt work processes to the changing global landscape. Adopting lean management, which focuses on eliminating waste and enhancing operational efficiency, is proposed as a suitable strategy to address these challenges. This method, which has proven increasingly vital in contemporary organizational management, is particularly advantageous in dynamic and complex situations (Keegan, 2016). The adoption of lean principles in developing countries like Thailand, characterized by limited resources but a large population, can significantly contribute to national development and enhance service delivery processes (Gupta et al., 2016). By incorporating lean management principles, it is possible to increase customer value and satisfaction while simultaneously reducing operational costs (Raj & Rehse, 2012).

The successful implementation of lean concepts in the service sector underscores the potential of this approach in the tourism industry, utilizing it as a primary instrument for economic advancement (Rauch et al., 2016). Efficient management of operations to deliver valuable tourism experiences that meet tourists' expectations can be realized through streamlined work processes (Tigu & Călărețu, 2013). The cornerstone of lean management within the context of CBT is to enhance operational efficiency across the supply chain activities by applying the value stream mapping (VSM) concept. This approach aims to eradicate waste throughout procurement, production, and service activities, ensuring a seamless flow of operations and ultimately delivering superior value to tourists. The objective is to fulfill the anticipated needs of tourists and guarantee their satisfaction (Andrés-López et al., 2015; Raj & Rehse, 2012). When applied specifically to community-based tourism, lean management seeks to identify and eliminate inefficiencies within the CBT management chain, thereby enhancing the efficiency of supply chain operations. This article introduces a conceptual framework based on lean principles, designed to identify the core values sought by tourists and address challenges impeding efficient tourism management. Utilizing this framework provides valuable insights into organizing effective tourism activities and contributes to the future advancement of CBT management.

This article proposes a conceptual framework grounded in lean principles designed to identify the core values tourists seek and to address challenges impeding efficient tourism management. Employing this framework provides critical insights into organizing effective tourism activities, which is instrumental for the advancement of CBT management. This study commences with a comprehensive literature review to define the foundational concepts pertinent to enhancing CBT management via lean tools, followed by a detailed presentation of the research methodology, findings, analysis, and recommendations. Ultimately, this research contributes significantly to the domain by proposing strategies to minimize waste in CBT supply chains and optimize overall management efficacy.

2. LITERATURE REVIEW

2.1. Impact of COVID-19 on the tourism industry in Thailand

Over the past decades, tourism has been a vital industry that has significantly contributed to the economic development of many countries around the world. It represents a crucial sector, accounting for

approximately 10% of the global GDP. Furthermore, it generates over 320 million jobs globally, including those within ASEAN countries. Thailand has adopted tourism as a key policy for economic development, recognizing its importance in generating income, driving the country's economy, alleviating poverty, and reducing inequality within society (Tourism Authority of Thailand, 2018).

During the decade preceding the COVID-19 pandemic (2010–2019), Thailand experienced a substantial influx of international tourists, welcoming nearly 40 million visitors and generating tourism revenue exceeding 3 trillion Thai baht (National Science and Technology Development Agency, 2020). However, the pandemic caused profound disruptions in the tourism industry, leading to a significant decline in tourist arrivals and a substantial reduction in tourism-related revenues (Ministry of Tourism and Sports, 2019). The International Monetary Fund (IMF) predicts that global tourism receipts will not return to pre-pandemic levels until 2023, primarily due to global travel restrictions and transportation limitations aimed at curbing the spread of the virus (Behsudi, 2020; Hussain et al., 2021). These restrictions have had far-reaching consequences for Thailand's economy, which heavily relies on tourism as a primary income source, particularly for community-based tourism destinations (Tourism Authority of Thailand, 2018).

While tourism has been integral to Thailand's economic growth and employment, the COVID-19 pandemic has starkly exposed the sector's vulnerabilities and caused substantial disruptions. The crisis has highlighted the fragility of over-reliance on international tourism, necessitating a reevaluation of strategies to mitigate such impacts. Current efforts to restore the industry are focusing on sustainable practices and revitalizing local tourism destinations, which are crucial for ensuring the sector's resilience and long-term sustainability. These initiatives aim to reestablish tourism's economic contribution and pave the way for a more robust and prosperous future for Thailand's tourism industry.

2.2. Tourism supply chain management (TSCM)

The concept of supply chain management (SCM) includes two primary types: the production chain and the service chain (Xu & Gursoy, 2015). Originating in the United States during the 1980s (Christopher, 2011; Stock et al., 2010), SCM has since profoundly influenced industrial production processes, garnering significant interest from scholars and practitioners alike. This interest is driven by the need to reduce costs, optimize resource utilization, and enhance customer satisfaction, with the ultimate objectives of maintaining a competitive advantage, improving efficiency, and outperforming competitors (Tigu & Călărețu, 2013; Zhang et al., 2009).

TSCM has emerged as a critical area of study within this broader context. Notable contributions by Tapper and Font (2004), Zhang et al. (2009), and Piboonrunroj and Disney (2009) have advanced our understanding of TSCM. Tapper and Font (2004) identified 16 interrelated components within the tourism business, illustrating the complexity and interconnectedness of the industry. Zhang et al. (2009) emphasized the importance of understanding the unique characteristics of the tourism sector, while Piboonrunroj and Disney (2009) highlighted the inherently collaborative nature of TSCM.

TSCM involves the coordination and integration of various organizations, resources, and activities to meet tourists' needs and ensure sustainable tourism. This includes several key aspects: **supply and supplier management**, which involves sourcing and managing suppliers of tourism goods and services; **process management**, focusing on the efficient transformation of inputs into final products; **value creation**, aiming to deliver exceptional value and satisfaction to tourists; and **movement and flow management**, ensuring the smooth delivery of tourism products and services throughout the supply chain.

Critically, TSCM is not solely about operational efficiency. It also necessitates a holistic approach that integrates sustainability at every stage of the supply chain. This integration is essential to ensure that tourism development does not compromise environmental, social, or economic resources. By focusing on these key aspects, TSCM aims to create a resilient and adaptable tourism sector capable of responding to dynamic market needs while promoting long-term sustainability. This comprehensive approach not only enhances the tourist experience but also supports the sustainable development of tourism destinations, underscoring the vital importance of effective TSCM in today's competitive and rapidly evolving tourism industry.

2.3. Community-based tourism (CBT)

CBT has increasingly been recognized as a viable and beneficial form of tourism for developing countries, bringing substantial advantages to local communities (Pookaiyaudom, 2013). Characterized by a strong sense of responsibility towards environmental and social sustainability, CBT is viewed as a strategic approach for community development and the conservation of community resources (Jain et al., 2000).

In Thailand, CBT first emerged in 1994 through the Rural Ecotourism and Sustainable Tourism (REST) project, implemented by the Volunteer Social Service (VSS), or Thai Volunteer Service (Kontogeorgopoulos et al., 2014). In 2003, the establishment of community management organizations took place to advance the development of sustainable tourism. These organizations aimed to integrate all stakeholders in defining

development directions and ensuring that tourism activities benefit the community (Chambers, 1997). While most benefits remain within the community, CBT not only mitigates the negative impacts of tourism but also generates positive outcomes by fostering respect and awareness for natural heritage and cultural traditions. This approach creates economic value within the local economy through supplementary occupations and community income generation (Lee & Jan, 2019).

Effective management of CBT requires alignment with the values and expectations of tourists. Despite its participatory and sustainable nature, studies highlight the significant impact of gender differences on attitudes toward tourism. Sabina and Nicolae (2013) emphasize the paramount significance of gender distinctions in tourist destinations, noting that globally, women play pivotal roles as visitors, hosts, or service providers. Women influence travel decisions and family expenditures and exhibit distinct perspectives on socially responsible consumerism, aligning with findings by Vespestad and Mehmetoglu (2015) that suggest gender disparities shape tourism consumption values. Women tend to prioritize travel experiences that offer mental relaxation, escapes from familiar environments, and opportunities for cultural exploration, distinguishing their preferences from those of men. Šenková et al. (2020) further highlight women's greater propensity to engage in culturally oriented activities.

In the context of community tourism, it is crucial to meet the expectations of the local community as a tourism destination and ensure compatibility with the needs of service providers within the community. To achieve this, community organizations must develop a comprehensive understanding of efficient tourism operations, minimizing waste, and optimizing the use of available resources. This involves conducting a thorough analysis of the entire process, from the initiation of operations to the delivery of tourism value, with a customer service perspective to identify the root causes of waste (Andrés-López et al., 2015; Goeldner & Ritchie, 2012). This approach enables the management of CBT to optimize efficiency, encourage sustainable practices, and ultimately cultivate a resilient and prosperous tourism sector.

2.4. Lean management in community-based tourism

The success of the Toyota Production System (TPS) has led to the emergence of lean methodology, recognized as an efficient operational system for creating competitive advantages (Shkliar, 2013). Introduced in 1990 through the book "The Machine that Changed the World," Lean focuses on eliminating waste and non-value-added activities, transforming them into valuable elements from the customer's perspective (Womack & Jones, 2003).

Lean management is a systematic approach aimed at eliminating waste and creating value for customers by improving processes to enhance customer satisfaction and achieve desired outcomes (Earley, 2016). Raj and Rehse (2012) define lean as a management approach that eliminates non-value-added activities, improves processes, and delivers added value and customer satisfaction. This is achieved by enhancing organizational capabilities, reducing variability, and eliminating waste in processes (Andrés-López et al., 2015).

When applied in the context of tourism, lean principles focus on improving work efficiency and enhancing business quality (van Assen, 2021). The implementation of lean management in CBT operates under the principles of lean tourism management, which consists of six key steps (Carlborg et al., 2013; Raj & Rehse, 2012):

1. Defining value: This step involves specifying the value of tourism products and services from the perspective of end-destination tourists, who are the service recipients.

2. Mapping the value stream: Value stream mapping aims to illustrate the entire work process involved in creating and delivering tourism products and services to tourists.

3. Continuous delivery of value: This step focuses on conducting operations that enable the continuous delivery of value in tourism products and services without disruptions, ensuring customer needs are met and satisfaction is maximized.

4. Pull system: Implementing a pull system allows for the responsive fulfillment of tourists' demands in terms of quantity and timing.

5. Standardization: Standardizing community-based tourism management serves as the foundation for studying and implementing service operation standards at various stages of tourism activities, ensuring safety and consistency.

6. Perfection: This step involves managing tourism operations effectively to meet expected value and satisfaction requirements while maintaining efficiency and eliminating waste.

Lean management aims to identify and eliminate wasteful activities within work processes to meet tourists' needs and ensure their satisfaction. In tourism management, waste in work processes includes overproduction, waiting, unnecessary transport, over-processing or incorrect processing, excess inventory, unnecessary movement, defects, and unused employee creativity (Liker, 2004). The service sector has specific forms of waste, building upon those identified in the manufacturing sector. Lean management principles offer a systematic approach to improving work efficiency and enhancing the quality of hospitality businesses,

including tourism. The application of lean principles in CBT involves defining value, mapping the value stream, ensuring continuous value delivery, implementing a pull system, standardizing operations, and striving for perfection. By identifying and addressing these forms of waste relevant to the service industry, lean management can lead to improved efficiency, increased customer satisfaction, and enhanced value creation in CBT operations.

2.5. Value stream mapping (VSM) leading to tourism destination productivity improvement

VSM is a critical approach for enhancing the efficiency of work processes in community-based tourism. The process begins with identifying the values of tourism products and services from the tourists' perspective and pinpointing any non-value-added wastes within the operations. Once these wastes are identified, they are systematically eliminated through value stream management, ensuring a seamless flow of services from providers to tourists (Garcia, 2015; Ghosh & Lever, 2020). This approach targets the root causes of inefficiencies, aiming to optimize the entire process.

VSM is a visual tool that maps all activities within community-based tourism, from the initial arrival of tourists to the community through various operational stages to the final delivery of products and services. By applying lean management principles and utilizing VSM, service providers can gain valuable insights into the operating procedures of tour activities at destinations like Phu Lom Lo. This enables better prediction and analysis of data related to tourists' preparation and movement, facilitating improved planning and resource allocation (Bonaccorsi et al., 2011).

Furthermore, VSM offers the advantage of developing new tourism routes and creating memorable experiences for tourists. It also allows for flexibility in service processes and effective management of limited tourism resources to enhance overall efficiency and service quality (Ghosh & Lever, 2020). Analyzing tour activities at Phu Lom Lo through VSM provides a comprehensive understanding of the operating processes, from upstream activities involving input production factors to downstream activities that deliver the final tourism products and services tailored to meet tourists' requirements.

VSM categorizes activities into three types: value-added (VA), non-value-added necessary (NNVA), and non-value-added (NVA) (Womack & Jones, 2003; Charron et al., 2015). This categorization allows for a thorough examination and optimization of the CBT supply chain, facilitating effective process improvement and enhancing the overall experience for both tourists and service providers.

Addressing the research gap in the application of lean management principles in CBT supply chains, this study proposes a conceptual framework based on lean principles. The framework aims to improve the management of suppliers and meet tourists' expectations by identifying waste areas and challenges that hinder operational efficiency. By developing this lean-based approach, the study contributes to efficient tourism activities, risk reduction, and the future development of CBT management. This holistic approach ensures that tourism destinations not only meet but exceed the expectations of their visitors, fostering a sustainable and competitive tourism industry.

2.6. Applications of waste management in tourism

The foundational principles of lean management focus on identifying and eliminating wasteful activities within work processes to create value and meet customer needs, thereby ensuring customer satisfaction. These principles can be effectively applied in CBT management. Studies have identified various forms of waste in work processes, such as overproduction, waiting, unnecessary transport, over-processing, excess inventory, unnecessary movement, defects, and unused employee creativity (Liker, 2004). In the service sector, academics have extended these principles to identify waste specific to service operations, building on the foundations of waste identified in the manufacturing sector.

Bicheno and Holweg (2009) explored waste in service businesses, highlighting differences from typical manufacturing operations. Their research identified several forms of service sector waste, including delay, duplication, unnecessary motion, unclear communication, incorrect inventory, missed opportunities to retain or win customers, and low-quality service or defective products. Similarly, Bonaccorsi et al. (2011) outlined service sector waste characteristics such as defects (e.g., inaccurate data, damaged goods), duplication (e.g., repetitive data reporting, excessive questioning), incorrect inventory (e.g., insufficient stock, wasted time searching for items), and lack of customer focus (e.g., unfriendliness, poor customer service). They also identified overproduction (e.g., unnecessary reports), unclear communication (e.g., non-standardized data formats), inefficient motion/transportation (e.g., poor workflow layouts), underutilized employees (e.g., lack of proper tools), variation (e.g., non-standard work processes), and waiting/delay (e.g., work stoppages, supplier delays). Qu et al. (2011) further elaborated on service sector waste, categorizing it into five aspects: service design waste, service item waste, service ability waste, service process waste, and service delay waste. They argued that these types of waste should be eliminated to reduce service costs and enhance the quality of services that customers desire.

Damrath (2012) delineates the parallels between service waste and manufacturing waste, highlighting several key aspects: **overproduction** involves generating service outputs beyond immediate needs, **waiting** refers to delays between consecutive activities, and **motion** includes unnecessary movement of people due to poor layout of service areas. **Overprocessing** is characterized by adding more value to the service than customers are willing to pay for, while **inventories** denote excess work-in-progress beyond customer requirements. **Transport** encompasses unnecessary movement of materials, products, or information, and **defects/errors** pertain to any service aspect that does not meet customer needs.

Charron et al. (2015) stated that in lean organization management, administrators must confront resource management and risk management while also being responsible for controlling and improving organizational efficiency. Before an organization can become lean, it is essential to identify the root causes of problems that are deemed non-value adding and should be eliminated or improved before implementing changes. These non-value adding aspects comprise 9 types of waste: **Overproduction**: Producing more than what subsequent processes or end customers require, leading to various inefficiencies such as excess inventory, transportation waste, and increased resource consumption. **Excess inventory**: Any inventory exceeding the requirements of the production process. Excess inventory often creates problems and leads to additional waste, such as increased labor, equipment maintenance, and space usage. **Defects**: Any aspect of a product or service that customers do not want, including features that require inspection, repair, or rework. Identification of defects must occur before products are delivered or after service usage in the form of warranties. **Extra processing/processing waste**: Processes that add unnecessary value from the customer's perspective. This includes redundant tasks that consume valuable time without adding value. **Waiting**: Time spent waiting for something to happen, whether it's human waits, machine or material waits, or waiting for information to proceed. Service waiting ultimately leads to customers waiting for service providers. **Motion**: Waste resulting from unnecessary or incorrect movements, such as the movement of people or information that does not add value to products or services, resulting in discontinuous flow. **Transportation waste**: Operations associated with moving equipment, materials, or parts, resulting from poor purchasing decisions, oversized products, or inadequate storage space or amenities. **Underutilized employees**: Arising from outdated beliefs that view employees as liabilities rather than assets, lack of promotion through training, and skills enhancement fails to leverage employees' full potential, leading them to perform only tasks assigned to them without using creativity. **Behavior waste**: Waste resulting from unproductive human behaviors, often stemming from individual beliefs or organizational culture. It includes behaviors like procrastination or self-isolation due to high self-esteem, which should be addressed as one of the primary steps in organizational improvement.

Andrés-López et al. (2015) assert that identifying waste in the service sector is complex due to the nuances of customer experience. Key waste areas include **overproduction** (completing more work than needed), **unnneeded transport or movement** (non-value-added movement of resources), **delay** (employees or customers waiting for information or service delivery), **over-quality/duplication** (activities that do not add perceived value), **underutilized resources** (wasting human potential and creativity), **manager's resistance to change** (management's reluctance to involve all employees in continuous improvement), **excessive variation/lack of standardization** (inconsistent processes and outdated procedures), and **failure demand/lack of customer focus** (services failing to meet customer expectations). Romero and Rossi (2017) further classify service sector waste as delays, repetitive processes, unnecessary movements, unclear communication, incorrect inventory management, missed customer care opportunities, service transaction errors, and poor service quality.

From this comprehensive literature review, it is evident that non-value-added activities significantly impede the value of community tourism. These insights are summarized in Table 1, illustrating the critical areas where waste occurs and providing a foundation for implementing lean management principles to enhance efficiency and customer satisfaction in community-based tourism.

Table 1: Analysis of the characteristics of waste in the service industry

Source	Characteristics of waste
Bicheno and Holweg (2009)	Delay, duplication, unclear communication, incorrect inventory, unnecessary movement or queuing, lost opportunity to retain or win customers, errors in the service delivered through products being defective or lost
Bonaccorsi et al. (2011)	Defects, duplication, incorrect inventory, lack of customer's focus, overproduction, unclear communication, motion/ transportation, underutilized employees, variation, waiting/delay
Charron et al. (2015)	Overproduction, excess inventory, defects, waiting, extra processing/processing waste motion, transportation waste, underutilized employees, waste behavior

Table 1: Analysis of the characteristics of waste in the service industry (continued)

Source	Characteristics of waste
Damrath (2012)	Overproduction, waiting, motion, over processing, inventory, transport, defects/errors, human talent
Andrés-López et al. (2015)	Overproduction, unneeded transport or movement, delay, over-quality, duplication, underutilized resources, manager's resistance to change, excessive variation, lack of standardization, failure demand, lack of customer's focus
Qu et al. (2011)	Service design waste, service item waste, service ability waste, service process waste, service delay waste
Romero and Rossi (2017)	Delays, duplication, unnecessary movement, unclear communication, incorrect inventory, service quality errors, an opportunity lost to retain or win customers, errors in the service transaction

3. RESEARCH METHODOLOGY

This research employed a mixed-method approach, integrating both qualitative and quantitative methodologies at various stages, including data collection, analysis, and interpretation. The aim was to enhance the efficiency of Kok Sathon's community-based tourism in the Phu Lom Lo supply chain by identifying and eliminating waste, thus delivering tourism value aligned with tourists' preferences. Previous studies indicated that gender differences influence tourism consumption values. Consequently, the researchers hypothesized that "Thai tourists of different genders will hold differing opinions regarding the value of community-based tourism."

3.1. Research design

A mixed-methods research design was employed. For qualitative research, the collection of geographical and primary data from key informants is specifically selected according to specified conditions (divided into three groups totaling 35 individuals) from the three groups: 1) The leadership group, comprising community leaders, knowledgeable individuals, and local wisdom custodians 2) The government and private sector personnel, along with individuals associated with tourism within the Kok Sathon Community, Dansai district, Loei province; and 3) The group consisting of individuals or operators responsible for the management of tourism activities within the Kok Sathon Community. The sample was selected using purposive sampling, and semi-structured interviews were conducted. The interview questions were framed with a broad outline to align with the overall objectives of the study. Additionally, participatory observation of tourism management activities and a quantitative questionnaire survey with a sample group of 400 tourists, convenience sampling, and a non-probability sampling method were employed for the sample selection.

The development of research tools for this study involved both qualitative and quantitative instruments. For qualitative research, tools included focus group discussions and interview techniques. The conceptual framework and interview topics aligned with the research objectives, and the interview guides were refined with input from tourism experts. Content validity was assessed using the item-objective congruence index (IOC), yielding a perfect score of 1.00.

For quantitative research, a questionnaire was designed based on relevant literature and studies, covering focal points. Content validity was ensured by academic experts. The refined questionnaire was tested on a sample of 40 individuals. The questionnaire's quality was evaluated using the item-total correlation method ($r = 0.473-0.883$), and reliability was confirmed with an alpha coefficient ($\alpha = 0.972-0.974$). Ethical approval was obtained through the exemption review process.

3.2. Data collection and analysis

The qualitative data obtained from interviews and participatory observations in the tourism management process were meticulously analyzed. Variables and resources used in the operations were carefully documented. This data was then subjected to value stream mapping (VSM) analysis within Kok Sathon's then current community-based tourism in the Phu Lom Lo supply chain to identify existing wasteful practices or problems encountered during service delivery, adhering to lean management principles. The analysis followed a systematic approach comprising six steps, including detailed interview analysis. Codes were derived semantically and contextually from the dataset. Conclusions were drawn to create a comprehensive CBT supply chain diagram and identify all stakeholders involved in CBT operations. The quantitative data from the questionnaires were analyzed to determine the core values sought by tourists when engaging in CBT activities and to identify any waste occurring during service delivery. Based on these findings, recommendations for improvements were made to enhance the efficiency and effectiveness of tourism activity management, ensuring alignment with tourists' preferences and expectations.

4. RESULTS AND DISCUSSION

4.1 Analysis of waste occurrence in the community-based tourism supply chain of Kok Sathon in Phu Lom Lo, Dansai district, Loei province

This study aimed to analyze the occurrence of waste in the management processes that deliver tourism value to tourists within the CBT supply chain of Kok Sathon. Employing the VSM concept, the research delved into the intricacies of activities involved in the tourism supply chain, providing detailed insights into operational costs, employee workload, and the time required to conduct tourism activities. The findings identified three distinct types of activities—VA, NNVA, and NVA—which were evident throughout the case study of the Phu Lom Lo tour. This analysis encompassed all stakeholders involved in the service operations, offering a comprehensive view that integrated both qualitative and quantitative research outcomes.

The qualitative results systematically classified and organized the data, demonstrating that tourism products and services utilized resources and raw materials from both within and outside the community, as presented in Table 2. Typically, direct service providers to tourists were community members affiliated with the KTA, who provided a range of products and services tailored to meet the diverse needs of tourists. Tourists had the option to purchase services either through intermediaries or directly, without the involvement of travel agents, based on their preferences.

The analysis further identified five key terms and generated initial codes, categorizing them under tier 2 suppliers. These included entities responsible for resource or raw material ownership, ownership of locations or tourist attractions, tourism support, and procurement for community use. Tier 1 suppliers were directly involved in providing services to tourists, engaging them in community tourism activities, and managing tier 2 organizers/operators. Tier 2 organizers/operators roles encompassed being sales representatives, promoting community tourism, and facilitating interactions between tourists and the community. Tier 1 organizers/operators managed activities, coordinated benefits with service providers, organized tourism events, and promoted tourism activities directly to tourists, who were the end-users of the community-based tourism experience.

Additionally, the quantitative analysis sought to identify the specific tourism value that tourists sought and to illuminate any waste or problems encountered during their participation in activities. This was accomplished through a combination of VSM analysis, and the examination of questionnaire data collected from a sample of 400 tourists, as seen in Tables 3–4. The study also included testing the research hypotheses that the researchers had formulated.

The coding analysis delineated the involvement of all stakeholders in the Kok Sathon CBT supply chain. Tier 2 suppliers included the Phu Hin Rong Kla National Park Department, hospitals, infrastructure facilities, and training entities for tour guides. Tier 1 suppliers comprised the Kok Sathon group's tour pickup trucks. Tier 2 organizers/operators included the Thai Ecotourism & Adventure Travel Association (TEATA), Local Alike Co., Ltd., and other government and private agencies such as the Thai Tourism Promotion Association and the Loei Provincial Office of Tourism and Sport. Tier 1 organizer/operator roles were fulfilled by the KTA. Lastly, tourists played a crucial role in utilizing the activities and services provided, as shown in Tables 2 and 3.

This study posits that tourism supply chain management encompasses a comprehensive set of processes, including supply, production/process, movement and flow, and value creation, aimed at delivering seamless experiences to tourists. The primary objective is to maximize value by adequately meeting the anticipated needs of tourists. This conceptualization aligns with the findings of Tigu and Călăretu (2013), Piboonrungrroj and Disney (2009), and Zhang et al. (2009), who emphasize that tourism supply chains are intricately managed processes designed to coordinate and integrate business activities effectively. The goal is to efficiently cater to the requirements of tourists as end recipients, optimizing the entire tourism experience.

Table 2: Kok Sathon's community-based tourism in Phu Lom Lo supply chain

Data Extract/Initial Code	Key words	Result
"...As soon as the Department of National Parks has announced the opening of Phu Lom Lo Tourism, it is the time when the community provides tour services ..." (A1)	Tier 2 Suppliers	- Phu Hin Rong Kla National Park - Hospital - Infrastructure facilities
"...We have tourist insurance. Plus, the driver has been trained to provide good service." (A31)		- Services Training
"...We have a large parking also CCTV cameras to take care of safety as well..." (A31)		

Table 2: Kok Sathon's community-based tourism in Phu Lom Lo supply chain (continued)

Data Extract/Initial Code	Key words	Result
"...We took them to see how beautiful the Sakura flowers here in Thailand are..." (A1) "...Above this mountain, a lot of ferns grow, look similar to our home vegetable. But it is not edible..." (A35) "...In the rainy season, we have to find a big chain to bind the wheels together to climb the ground..." (A5)	Tier 1 Suppliers	Kok Sathon Group's tour pickup trucks
"...This group came from TEATA where we traveled and contacted..." (A34) "...Our company contacted through the province first. because we join the project to "travel together". This group is the Sub-district Administrative Organization, most of them are elderly people..." (A2) "...Local Alike, he told us to prepare a caretaker of high-ranking elders to take him on a trek on the top of Dud Shani Mountain..." (A1)	Tier 2 Organizer/ Operator	- Thai Ecotourism & Adventure Travel Association (TEATA) - Local Alike Co., Ltd. - Thai Tourism Promotion Association - Loei Provincial Office of Tourism and Sport - Other government and private agencies
"...For this year's public benefit fund, our group will donate to the sub district health center due to their significant hard work..." (A1) "...This year was better, we were deducted 150-baht for our group, 10 percent like other activities..." (A1) "...We arrange queues up according to the car number. In the evening, we will know our queues..." (A8)	Tier 1 Organizer/ Operator	Kok Sathon Community Based Tourism Association (KTA)
"...This morning, I picked up 2 tourists from the bus station when finished this, I will send them to go to Chiang Khan..." (A8) "...This group came from Thai Tourism Promotion Association, that we have contacted..." (A34) "...This group from the project of "travel together" is the Sub-district Administrative Organization. Most of them are elderly people..." (A2)	Tourist	- Tourists traveling in groups who buy travel programs through intermediaries - Individual travelers that do not go through a travel intermediary. They may travel alone, as a couple or in a small group.

Table 3: Demographic data

Variables	Items	Number	Percentage
Gender	Male	148	37.00
	Female	252	63.00
Age	below 15	10	2.50
	16-20	48	12.00
	21-30	51	12.80
	31-40	96	24.00
	41-50	80	20.00
	More than 50	115	28.70

Table 4: Opinions regarding the value of the Phu Lom Lo community-based tourism

Value of community-based tourism	\bar{X}	S.D.	Opinion Level
1. Seeing and taking photographs with a large number of beautiful blooming flowers	4.53	.604	The Highest
2. Safe travel throughout the tourist route.	4.39	.681	High
3. Service providers who are wholehearted and ready to provide quality service.	4.37	.762	High
4. Application of technology to enhance customer satisfaction	4.29	.738	High
5. Effective management systems that contribute to sustainable tourism.	4.35	.787	High

The demographic analysis of tourists utilizing Kok Sathon's CBT services revealed that the majority are females (63%), predominantly over the age of 50 (28.70%), with the second largest group aged between 31-40 years (24%). This demographic information, presented in Table 3, provides valuable insights for

tailoring tourism activities to meet specific preferences and needs. In addition, Table 4 details the perceived values of tourism activities at Phu Lom Lo, with the highest rated desire being the opportunity to observe and photograph a multitude of beautiful blooming flowers (mean = 4.53).

Upon identifying these core values sought by tourists, management engaged in a collaborative analysis using Value stream mapping (VSM) to align services with tourist expectations and eliminate inefficiencies. The VSM analysis focused on the Phu Lom Lo tour activities, dissecting each trip into its component procedures and activities. This analysis found that each trip typically involved three service provider members and one driver, executing eight procedures across 15 distinct processes or activities. The total lead time (LT) averaged 320.40 minutes, with value-added (VA) activities—those directly enhancing the tourist experience—constituting 43.66% of this time (139.90 minutes). The necessary but Non-Value Added (NNVA) activities, essential but not directly contributing to service enhancement, accounted for 50.71% of the time (162.50 minutes). Lastly, non-value added (NVA) activities, which are superfluous and should be eliminated, comprised 5.61% of the time (18 minutes). This includes processes or activities as indicated by items 2, 3, 4, and 8. Table 5 illustrates the development of the current VSM through analysis of the data from the six participatory observation records.

An analysis of waste within CBT operations was conducted based on the alignment with lean hospitality principles and included data analysis through VSM. This analysis spanned from tourists' arrival at the destination to the completion of their experience. The results identified nine distinct types of waste affecting the CBT management process:

1. Non-participation/non-community involvement: Insufficient engagement and cooperation from the community, resulting in underutilized talents and creativity.

2. Lack of identity/storytelling: Absence of a compelling origin story or distinct community identity associated with the tourism destination.

3. Unclear communication: Poor clarity and accuracy in communications, inappropriate use of communication channels, and inconsistency.

4. Overproduction/over-processing: Conducting tourism activities that do not add value from the customers' perspective, often too complex or inaccessible.

5. Waiting/delay: Excessive delays or waiting times in the delivery of services.

6. Transportation/motion: Inadequate or unnecessary transportation methods and movements.

7. Non-Organization and management: Inadequate community organization, management systems, and operational mechanisms, along with insufficient use of technology and innovations.

8. Defects: Flaws or errors in tourism products and services that do not meet tourists' expectations.

9. Tourism marketing: Insufficient interaction between consumers and service producers, limiting value creation and the exchange of benefits.

This detailed analysis stresses the critical areas for improvement within the CBT management process, aimed at enhancing efficiency and the overall tourist experience.

Table 5: Value stream mapping (VSM) of the Phu Lom Lo community-based tourism

	Procedure	Item	Process or Activity	VSM	Member (Person)	Time (Mins)/Pickup			Time (%)
						PT	PLT	LT	
Before the Trip	Tourists Arrive	1	Parking and walking to the office	NVA	0	0.00	1.50	1.50	0.47
	Registration and screening	2	Temperature measurement	NNVA NNVA NVA	3	00.00	11.00	11.00	3.43
		3	Scanning QR code	NVA					
		4	Filling personal data	NVA					
		5	Hand washing with gel	NNVA					
	Payment and Information	6	Payment and inform details tourists	NVA	2	0.00	7.00	7.00	2.18
	Boarding and Departure	7	Drivers reporting and inform how to get on-off truck safely	NNVA	1	3.30	0.00	3.30	1.03

Table 5: Value stream mapping (VSM) of the Phu Lom Lo community-based tourism (continued)

	Procedure	Item	Process or Activity	VSM	Member (Person)	Time (Mins)/Pickup			Time (%)
						PT	PLT	LT	
During the Trip	Checkpoint and Payment	8	Checking	NVA	3	6.60	15.00	21.60	6.74
		9	Paying entrance fee	NVA					
	Tour guide on Phu Lom Lo	10	Section 1	VA	1	50.00	51.00	101.00	31.52
		11	Section 2	VA	1	30.00	6.00	36.00	11.24
		12	Section 3	VA	1	45.00	17.00	62.00	19.35
		13	Section 4	VA	1	5.00	37.00	42.00	13.11
Back to the Club Office	14	Back to the club/ parking lot/resort	VA	1	0.00	35.00	35.00	10.92	
After the Trip	Tourists Departure	15	Tourists depart from Phu Lom Lo	NNVA	0	0.00	0.00	0.00	0.00
Total						139.90	180.50	320.40	100.00

Note: PLT: Production lead time means non-value-added activity time (NVA) and necessary non-value-added activity time (NNVA), PT: Processing Time refers to the time spent on process operations, which is the time of activity adding value (VA) to the process., LT: Lead time means the total amount of time used for one tour activity, including the time value of PLT and PT.

4.2 Enhancing supply chain efficiency for Kok Sathon's community-based tourism activities

The results presented in Table 6 detail the efficiency improvements in employee costs and time. Initially, four staff operators conducted 15 activities, requiring a total of 320.40 minutes. Following the implementation of efficiency enhancements, the number of activities performed by the operators decreased to 10, a 33.33% reduction, and the overall service process time was cut down to 302.40 minutes, marking a 5.61% decrease. These modifications significantly enhanced operational efficiency by optimizing employee workload and streamlining service processes, consequently boosting productivity in service delivery.

During the evaluation of the current value stream mapping (VSM), it became apparent that prior issues had been identified, prompting improvements that established a well-balanced schedule and workload for employees. Additionally, the implementation of a queuing system based on reservations and advance online registration greatly reduced the number of steps and the time required for service delivery, aligning with the practices recommended by Bonaccorsi et al. (2011). Similarly, research by Rauch et al. (2016) validated the effectiveness of applying lean techniques within the service industry, noting that these methods not only reduce work process complexity but also enhance operator convenience and efficiency through a comprehensive visual representation of workflows. Further studies by Charron et al. (2015) and Garcia (2015) emphasized the necessity of precisely identifying client needs to effectively deploy lean tools within the hospitality sector, highlighting the importance of eliminating non-essential processes to streamline operations and improve performance.

The hypothesis testing in this research explored whether Thai tourists of different genders perceive the value of community-based tourism differently. According to the analysis in Table 7, tourists of various genders did indeed show differing opinions regarding the value of appreciating and photographing blooming flowers, with this variation achieving statistical significance at the 0.05 level. This finding is consistent with Veststad and Mehmetoglu (2015), which suggested that gender differences affect tourism preferences, with females more likely to prioritize travel for relaxation and learning about destinations. Conversely, the study's findings on perceptions regarding sustainable management systems for tourism contrasted with those of Šenková et al. (2020), who reported that females generally exhibit a more positive attitude towards sustainability in tourism than males.

The analysis of the operational processes of Kok Sathon's community-based tourism identified several potential opportunities for value creation and capture. Moving forward, the process will see significant improvements, such as replacing manual registration and COVID-19 screening with an online registration system prior to tourists' arrival. This change aims to reduce waiting times and minimize physical contact. Additionally, enhancements in signage and the interpretation of tourism within the community will be implemented. The traditional cash payment method will be phased out in favor of online payment systems and QR codes, and redundant payment processes at the park entrance will be integrated with the tour fare, as illustrated in Figure 1. These improvements are designed to streamline operations, enhance the tourist experience, and align with current technological advancements and health safety measures.

Table 6: Analysis of operational efficiency

Operation Improvement							
Operators (persons) and Activities (tasks)				Total Time (minutes)			
Before		After		Differences (%)	Before	After	Differences (%)
Operators	Activities	Operators	Activities				
4	15	4	10	33.33	320.40	302.40	5.61
Removed 5 activities in total				Reduced 18 minutes in total			

Table 7: Comparing the core values desired by tourists in different gender groups

Variables	Gender	\bar{x}	SD	t	p
1. Seeing and taking photographs with many blooming flowers	Male	4.62	.540	2.303	.022*
	Female	4.48	.634		
2. Safe travel throughout the tourist route	Male	4.47	.644	1.931	.054
	Female	4.34	.698		
3. Service providers who are wholehearted and ready to provide quality service	Male	4.45	.683	1.543	.124
	Female	4.33	.803		
4. Application of technology to enhance customer satisfaction	Male	4.32	.730	1.741	.082
	Female	4.19	.749		
5. Effective management systems that contribute to sustainable tourism	Male	4.43	.661	2.203	.028
	Female	4.27	.714		

Note: P-values were significant at * $p < .05$.

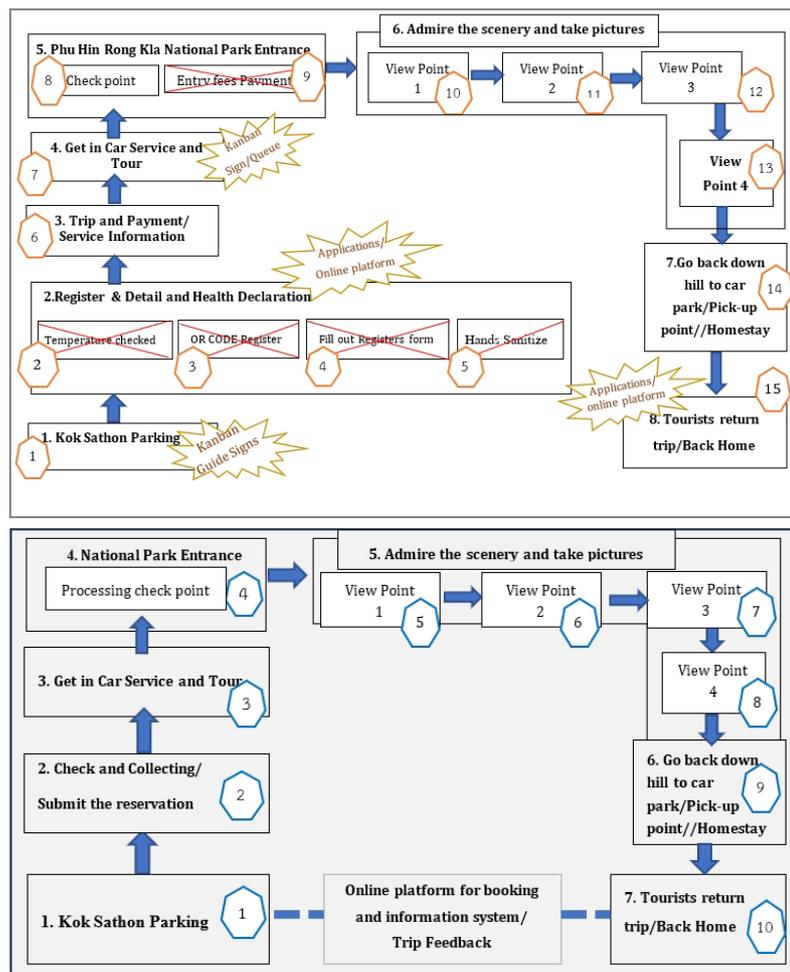


Figure 1: The current and future state of CBT VSM operation improvement

5. CONCLUSION AND RECOMMENDATIONS

5.1. Addressing challenges and eliminating waste in tourism

To effectively address challenges and eliminate wasteful practices within the tourism sector, it is imperative for tourism entrepreneurs to possess a profound understanding of the fundamental values tourists seek from their travel experiences. This study underscores the necessity of mitigating delays, service confusion, and inaccuracies in tourist information. To achieve this, it is recommended to encourage the adoption of innovative solutions and modern technologies. These tools enable tourists to engage in self-guided preparations prior to their journeys, which could include accessible platforms and applications that allow tourists to independently access comprehensive tourism information, explore activities, make reservations, and conduct advance payments. By providing tourists greater control and access to information, the complexities associated with pre-departure activities can be significantly reduced, thus enhancing customer satisfaction, and streamlining the operational processes for service providers in community-based tourism.

5.2. Enhancing operational efficiency

Improvements in workflow processes were identified, aimed at making operations more convenient and reducing complexities, thereby decreasing delays in tourist service delivery. Specifically, studying the pre-arrival preparation phase and understanding tourists' information needs are pivotal for minimizing steps and time in the service preparation process. The value stream map of each tourism activity, which includes various steps and processes, should be tailored to the core values of the specific tourism activity. From a tourist's perspective, the elimination of waste and minimization of discarded resources necessitates that practitioners or team leaders conduct thorough analyses. Such analyses are essential to create a clear and shared understanding of the current value delivery within tourism activities and provide a comprehensive overview of collaborative work for all parties involved.

5.3. Guiding principles for waste elimination

The findings of this research highlight the critical importance of identifying and eliminating NVA waste in tourism management. The identified nine wastes of tourism serve as guiding principles for pinpointing the root causes of waste and addressing operational issues across various community-based tourism activities. Additionally, acknowledging that different groups of tourists—based on gender or other distinguishing characteristics—may have unique perspectives and expectations regarding the value of tourism activities is crucial. Therefore, service providers should conduct thorough research into the characteristics of their target tourist groups to offer tailored and well-aligned tourism activities. This approach not only ensures the optimal utilization of available resources, considering cost-effectiveness, but also provides the most rewarding experiences for tourists, as illustrated in the research framework in Figure 2.

In conclusion, by integrating these strategic insights and recommendations, tourism entrepreneurs can enhance the efficiency of their operations and deliver superior value to tourists, thereby fostering sustainable and profitable tourism practices.

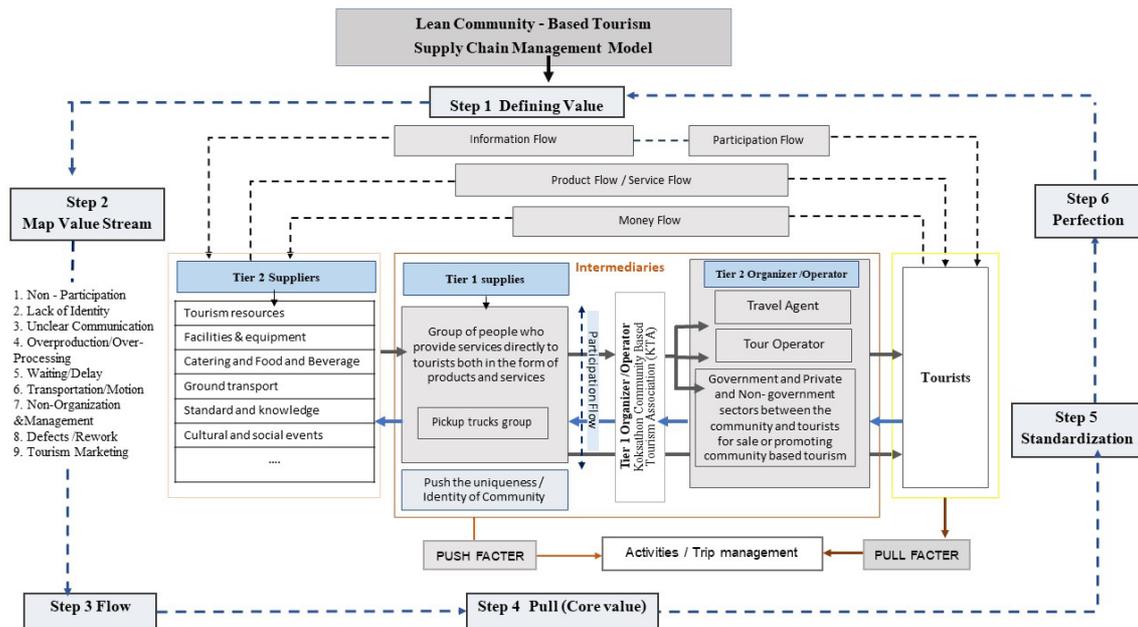


Figure 2: Lean community-based tourism management model

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