The development of community products using design thinking based on cultural heritage: A case study of Kamphaeng Phet Province, Thailand

ABSTRACT

The purposes of this research were 1) to study community products towards the development of product potential for tourism, 2) to develop community products using design thinking methods using the cultural heritage capital, and 3) to assess tourist satisfaction towards community products based on cultural heritage. The research was conducted in three phases: Phase 1 studying community products towards the development of product potential for tourism, Phase 2 developing community products using design thinking methods using the cultural heritage capital, and Phase 3 assessing tourist satisfaction towards community products based on cultural heritage. For Phase 1, two cultural tourism communities in Kamphaeng Phet Province, Thailand, were chosen for this research. The development of community products included consideration of community potential, cultural heritage, and tourism products (CCT), and these resulted in CCT Model. For Phase 2, the use of the five stages of design thinking and design thinking tools were employed with CCT Model of the communities in order to create their community products based on cultural heritage (i.e., three products for each community). For Phase 3, the satisfaction of 100 tourists were assessed in terms of five aspects, including 1) connection with tourism, 2) connection with cultural heritage, 3) value based on identity and cultural heritage, 4) marketing ability, and 5) product quality. The community products were successfully created, and the overall satisfaction assessment result was at a high level. Recommendations for further research are also discussed.

KEY WORDS
community products, design thinking, cultural heritage

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Introduction

Cultural heritage is something that humans have invented or created since the past, and it has been inherited from generation to generation. This includes, for example, antiques, language, dresses, various cultural traditions, and so on.

Regarding the term "cultural heritage", there are important characteristics based on the word "culture", relating to the period of inheritance or existence. It is accepted as something of value which shows the identity or uniqueness of that community or society.

It is something to be proud of for people in the society. As a result, the design and development of cultural heritage products is one of the most important issues affecting the perception of product users as well as the communication between cultural heritage products and the users (Hofstede, Hofstede & Minkov, 2010). It can be said that, the development of community products is a process that arises from the foundation of the community's culture (Spencer-Oatey, 2012).

Therefore, the relationship between community products and culture influences the demand for the products and the expression of those products.

Tschimmel (2012) stated that design thinking is a mechanism that drives innovation. It does not only drive designers, but it can also contribute to many careers and all types of organisations through process models and design thinking tools based on the combination of "thinking" and "design". This provides interdisciplinary careers with the opportunities to use tools and design to solve problems and develop products and services. These days, design thinking is not only a cognitive process or a conceptual framework, but it is also a powerful toolkit for developing any products and innovation by logically linking creative design approaches with traditional business thinking.

From this concept, the researchers therefore would like to develop community products by using people in the community as the center to meet the needs of consumers, product selection, and services in which the designers must be agents in solving various problems. This notion is consistent with Lawson (2012) who places importance of people in the community as a center in responding to customers' needs. As a result, this present research conducted a case study in two communities, namely Khlong Suan Mak Ban Nakhon Chum Community and Ban Wang Phra That Trai Trung Community in Kamphaeng Phet Province, Thailand. They were chosen since they were cultural tourism communities of Kamphaeng Phet Province, and Kamphaeng Phet Province is a province that has been certified as "World Cultural Heritage City" as certified by UNESCO in 1991 (UNESCO, n.d.).

The study was conducted by using the design thinking with various design thinking tools. From the study of the design thinking method tools of Lewrick, Link & Leifer (2018) in order to solve problems for communities in linking their own community products with tourism based on cultural heritage. People in the community were the center of thinking, creativity, design, and the development of community products. This aimed to create valuable tourism products of world cultural heritage cities. This research therefore explored and organised activities with participation from the communities using the following design thinking tools: 1) creating a persona, 2) asking WH questions (i.e., what, who, why, where, when, and how questions), 3) considering multiple perspectives, 4) creating a flower map, 5) structuring and selecting ideas, 6) making an idea communication sheet, 7) considering prototype creation, 8) using feedback-capture grid, and 9) using a retrospective board.

Research objectives

1. To study community products towards the development of product potential for tourism
2. To develop community products using design thinking methods using the cultural heritage capital
3. To assess tourist satisfaction towards community products based on cultural heritage

Literature Review

The concepts of design thinking

Johansson-Sköldberg, Woodilla & Çetinkaya (2013) analysed that the design thinking from two main source groups: designers and businessmen. These two groups place importance on working in a group. This is an important factor in the design thinking process. When the design thinking processes of both groups are properly integrated, it results in creating good work. Seidel & Fixson (2013) were interested in using design thinking with interdisciplinary groups in order to help students from different professional fields who had little design experience to display their creative designs. From their research, it was found that the design thinking model could help to create the ideas and select ideas. However, when it had been used for a long time and repeatedly, it would not create new ideas. Additionally, although working in a group helped to create effective thinking, brainstorming depended on the composition of people in the group who had little experience in designing. Consequently, this could only succeed if the group received good advice to help them find ways to combine their ideas.

It is important to note that, when conducting this present research, the researchers brought design thinking, transferred it to people in the communities, and acted as "facilitators" to provide advice, build confidence, and create courage to the communities to express themselves.

Jobst et al. (2012) conducted a study comparing creative confidence and self-efficacy. It was found that there were four factors that led to confidence in creativity, including 1) experience from experts, 2) experience from reading, listening, and studying other people's work, 3) creating motivation from suggestions, and 4) emotional state and expression. These factors help to create a positive experience and confidence in creating designs. Also, Goldschmidt & Rodgers (2013) studied the design thinking of three groups of designers, aiming at comparing individual differences in their design thinking process. It was revealed that each individual would solve the problems differently and take different time.

Abraham, Howard & Asinyo (2022) studied the use of design thinking methods in small and medium-sized textile enterprises in Ghana. The results showed that the use of design thinking methods based on human-centered design made the products connected to and influenced by customer needs. These entrepreneurs could also use different strategies to find solutions for customers and continuously interact with customers to solve innovative and creative problems. It was also found that there was a lack of empirical studies on design thinking in small and medium-sized enterprises (SMEs) in textile,

such as organisational design thinking in the context of developing countries. Therefore, there is a call for the study of innovation in SMEs, which is of great importance in economic development (Daksa et al., 2018; Fu, Pietrobelli & Soete, 2011; Pisoni, Michelini & Martignoni, 2018).

Lake et al. (2024) explored and extended current research, aiming to understand the value and limitations of teaching design thinking in higher education. The findings showed that following a structured learning process, participating in active listening, and focusing on others' perspectives are the most valuable design thinking practices across disciplines.

Moreover, design thinking also encourages collaboration and project framing that emphasizes shared critical analysis. From a study by Cai, Lin & Zhang (2023) focusing on when and how to use the design thinking process in innovation development, it was found that the steps that lead the implementation of design thinking process occurs in three distinct phases, namely fuzzy front end, development and testing, and commercialization. It has been shown that organisations use design thinking in four design practices: 1) user-centeredness, 2) embracing diversity, 3) visualization, and 4) iteration. This aims to transit from the fuzzy front end to development and testing, and it finally leads to commercializing new products.

Gao & Yu (2023) conducted a study on knowledge exchange of SMEs service innovation using design thinking. It was found that SMEs can use and incorporate design thinking in order to think together and leverage the group's knowledge to achieve service innovation. Also, it demonstrates that the mindset of leaders, executives, and employees is critical to successful design thinking implementations. Importantly, design thinking should be emphasized with executives first, and it should also focus on employee participation. Carella et al. (2023) researched the design thinking concepts for entrepreneurs. The responses to the questionnaire regarding practical participation revealed that entrepreneurs are sensitive to diverging and converging dynamics and to the visualization ability. In addition, they are aware of the benefits and capabilities of design thinking from the early phases of the development to the building of a specific design mindset.

Li, Ho & Yang (2019) conducted a design thinking-based study of the prospect of the sustainable development of traditional handicrafts. It was found that, based on the use of design thinking proposed by Hasso Plattner Institute of Design at Stanford University (2010) in exploring the opportunities of sustainable development of traditional handicrafts, there were 24 "indicators of the sustainable value of handicraft design" and four value dimensions, namely, "material and innovative value", "handicraft and cultural value", "empirical and local value", and "sharing and interactive value".

It can be concluded that exploring the sustainable development of handicraft design also forms the sustainable development model of design thinking.

In addition, many research studies also found that design thinking process is an important process and guideline that contributes to innovation development, product design and development, and the development of business models for sustainability from the participation of leaders and people in the organisation (Andrews, 2015; Elsbach & Stigliani, 2018; Geissdoerfer, Bocken & Hultink, 2016).

Conceptual framework used in this research

As for the conceptual framework used in this research, the researchers analysed related documents and research studies by drawing on a design thinking model that is widely used in solving problems, namely the Design Thinking Model proposed by Hasso Plattner Institute of Design at Stanford University (2010).

The five stages of Design Thinking were applied together with the tools of Lewrick, Link & Leifer (2018) to suit community potential. In this research, the communities brought their own cultural heritage, both tangible and intangible cultural heritage to be a question/problem of design thinking. Each step passed the assessments of the design thinking process, including a self-assessment and an assessment by experts who visited the areas to observe as well as creating criteria for evaluating results according to the research objectives. The conceptual framework is shown in Figure 1 below.
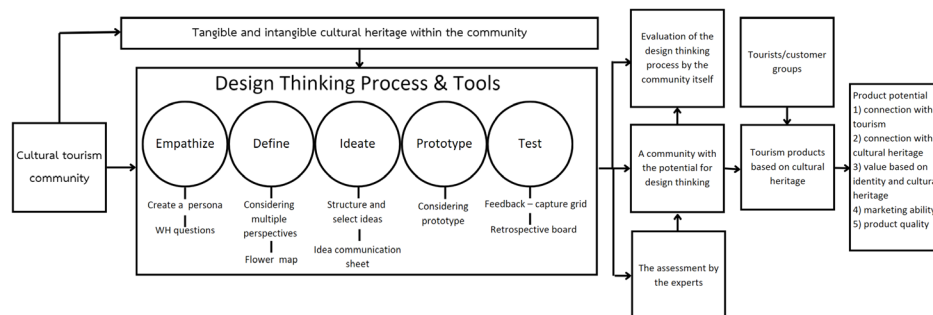
» **Figure 1:** *The conceptual framework of this study*

Research Method

In this study, the research procedure was divided into three phases as follows.

Phase 1: Studying community products towards the development of product potential for tourism

In this phase, the researchers studied the format of community products from the case study of two cultural tourism communities: 1) Khlong Suan Mak Ban Nakhon Chum Community and 2) Ban Wang Phra That Trai Trung Community in Kamphaeng Phet Province, Thailand. From the area visits, observation, and group discussion, the researchers analysed the original approaches used in developing their community products that were used to link existing cultural heritage with their community products. In addition, the researchers also synthesised these data into a model that communities used to develop the potential of tourism products based on cultural heritage.

Phase 2: Developing community products using design thinking methods using the cultural heritage capital

After getting the model that was used as a guideline for developing product potential for tourism based on cultural heritage in Phase 1, this guideline was applied into design thinking activities according to the Design Thinking Model proposed by Hasso Plattner Institute of Design at Stanford University (2010).

The five stages of Design Thinking included 1) empathize, 2) define, 3) ideate, 4) prototype, and 5) test. Additionally, the design thinking tool of Lewrick, Link & Leifer (2018) was also employed as a guideline for organising design thinking activities by using people in the communities as a base. The questions/problems were then defined and linked cultural heritage within the community with tourism products in the community. The details of this process are as follows.

1. As for the "Empathize stage", the tools used in organising activities were as follows.
   a. Creating a persona: The researchers created a persona by having the community to brainstorm, draw hypothetical characters of the target group, and identify the characteristics of the target group who were the community's product buyers onto a large sheet of paper, and discuss and summarise the results together.
   b. Asking WH questions: After creating a Persona, the researchers asked the community to ask and answer the WH questions about questions/problems and solutions in developing the products based on cultural heritage. The researchers and the community then discussed and summarised the results together.

2. As for the "Define stage", the tools used in organising activities were as follows.
   a. Considering multiple perspectives: It was a consideration of various perspectives. The community brainstormed to propose ways to use the cultural heritage of the area in connection with the product development by jointly presenting cultural heritage in the community both in tangible and intangible forms from various perspectives. The obtained ideas were then written on a large sheet of paper. After that, they were voted for appropriate cultural heritage, and the results were summarised together.
   b. Creating a flower map: It was a flower map. The community brainstormed and selected only important issues in the product development that were connected on the basis of cultural heritage from various issues. The obtained ideas were then written on five-eight flower petals on a large sheet of paper by jointly making suggestions and selecting. The results were then summarised together.

3. As for the "Ideate stage", the tools used in organising activities were as follows.
   a. Structuring and selecting ideas: The researchers structured and selected ideas. In this stage, the community members were given small pieces of paper, and they were asked to present their ideas through drawing the product. These drawings were then put on the board by classifying the ideas into three parts: 1) solving the question/problem, 2) being interesting although it did not answer the question/problem, and 3) others (i.e., apart from the question/problem). The guidelines and types of products for the development were then summarised together
   b. Making an idea communication sheet: It was idea communication sheet. The community brought the products from the structure and select ideas summary to design a simple sketch, including writing an explanation of the concept and development guidelines. The results were then summarised together.

4. As for the "Prototype stage", the tools used in organising activities were as follows.
   a. Considering prototype creation: It was consideration for creating a prototype. The researchers used the sketches from the Idea communication sheet to create prototype products. After that, the community considered, revised, developed the prototypes with participation, and summarised the results of prototype development.

5. As for the "Test stage", the tools used in organising activities were as follows.

a. Using feedback-capture grid: It was feedback-capture grid. The researchers brought the prototype products to distribute and test for sale. In this stage, the community recorded feedback of tourists on community products, divided into four areas: 1) tourists' preferences, 2) purchasing needs, 3) questions that arise, and 4) suggestions/Ideas. The results were then summarised together.

b. Using a retrospective board: It was a retrospective board. In this step, the community reviewed the design thinking process that took place by brainstorming and presenting issues to the process that had been carried out, divided into four issues: 1) things that were beneficial and needed to be continued, 2) things that would not be continued, 3) things that would like to be done further, and 4) things that were not important. The results were then summarised together.

By organising activities according to each design thinking tool, in addition to the community being able to evaluate the processes that occurred on their own with the Retrospective board, there was also observation by three experts in design thinking. They assessed the design thinking process that occurred in the community in each design thinking tool in terms of participation of people in the community, solving problems and developing ideas of people in the community, and analysing and summarising the overall results from community processes with 5-point rating scale criteria.

Phase 3: Assessing tourist satisfaction towards community products based on cultural heritage

In this phase, the community products developed from the design thinking process were brought to an exhibition and trial sales at the cultural market which was a cultural tourist spot.

The data from a group of 100 tourists were collected using online assessments in order to assess their satisfaction according to five aspects obtained from a synthesis of related documents and research: 1) connection with tourism, 2) connection with cultural heritage, 3) value based on identity and cultural heritage, 4) marketing ability, and 5) product quality.

Results and Discussion

The results and discussion of this research are presented according to the three research objectives of this study.

1. The results regarding Research Objective 1 aiming at studying community products towards the development of product potential for tourism

From visiting the areas to study the patterns and guidelines for creating community products towards the development of product potential for tourism, the researchers chose two communities that were outstanding in developing products for cultural tourism in Kamphaeng Phet Province as follows: 1) Khlong Suan Mak Ban Nakhon Chum Community and 2) Ban Wang Phra That Trai Trung Community.

Based on the in-depth interviews with leaders and representatives in each community (10 people of each community) as well as following the process of creating cultural products in both communities, guidelines for developing traditional community products could be summarised. This consisted of taking the potential of the community into account, linking with cultural heritage, and creating tourism products. The researchers named the process that occurred in the communities as CCT Model. The meaning of each abbreviation is as follows.
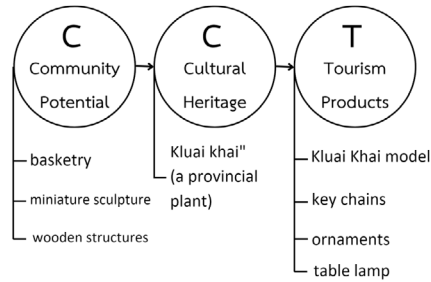
C stands for Community Potential. It means wisdom, skills, including abilities and efficiency within the community in terms of administration and allocation of resources within the community. It is the starting point and basis of the community development. Various products come from knowledge, abilities, and beliefs that are used to solve basic community problems. The community creates products that are basic to life and are the basis of skills and the potential of the community according to the potential and possibilities of the community in a sustainable way.

C stands for Cultural heritage. It refers to cultural capital that is a bond and has been passed on to the next generation, both in a tangible and intangible forms. It is an important element in expressing the identity of that area, whether it is the form of product styles, customs, traditions, beliefs, places, geography, and so on. They are important "ideal resources" in developing products to connect with tourism based on cultural heritage. It is part of the cultural capital that is applied as inspiration and components in creating product styles under the identity of the area.
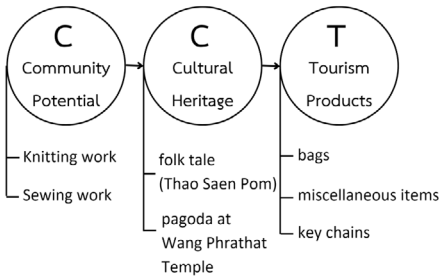
T stands for Tourism products. It refers to the development of community product formats to be linked with tourism based on cultural heritage. It is the use of cultural heritage capital as a resource for the development of formats and methods for presenting products according to the potential of the community. It is presented in the form of products for tourism that has the identity of the area linked to tourism that reflects the charm of the way of life, culture, history, and stories. It is something that adds value to tourism products, suitable for buying for use and buying them as souvenirs for tourists.

The CCT Model of these two communities in this present study is shown in Figure 2 below.

Community 1: Khlong Suan Mak Ban Nakhon Chum Community

C — Community Potential
- basketry
- miniature sculpture
- wooden structures

C — Cultural Heritage
- Kluai khai" (a provincial plant)

T — Tourism Products
- Kluai Khai model
- key chains
- ornaments
- table lamp

Community 2: Ban Wang Phra That Trai Trung Community

C — Community Potential
- Knitting work
- Sewing work

C — Cultural Heritage
- folk tale (Thao Saen Pom)
- pagoda at Wang Phrathat Temple

T — Tourism Products
- bags
- miscellaneous items
- key chains

» **Figure 2:** *CCT Model*

From the results of the study, it was found that the guidelines for developing cultural products of both communities included the same factors, namely taking the potential of the communities into consideration first. It needed to consider the appropriate skills and work performance of the community to create their community products. In Community 1, it was outstanding in basketry, miniature sculpture, and wooden structures. After the community understood its own potential, there is therefore a connection with cultural capital in that they brought "Kluai khai" (i.e., lady finger banana) which is a provincial plant and is remembered in the provincial motto, to link to the product style for cultural tourism, such as the Kluai Khai model, Kluai Khai key chain, Kluai Khai ornaments, and lamps as provincial souvenirs.

While Community 2 had potential in knitting and sewing work. This led to bridging cultural capital by using the story of the folk tale "Thao Saen Pom" that is well known in Thai folk tales. It is both a legend and a belief that references events from real tourist attractions in the community. It is a miraculous story about a man named "Saen Pom" who was born with an ugly face. There were nodes all over the body. He lived his life by growing eggplant trees. When the daughter of the ruler of Nakhon Trai Trung ate Saen Pom's eggplant, she miraculously became pregnant. After that, the governor of Nakhon Trai Trung gave his daughter to marry Saen Pom. After that, Saen Pom met a magic drum from a monkey in the forest. Saen Pom played the drum and found that he could make any wish. When he played the magic drum, his wish would come true. Saen Pom then asked for a blessing that he would be cured of the nodes all over his body and become a handsome young man.

Also, he beat the drum to create the city of Thepnakorn and appointed himself as Thao Saen Pom from then on.

From the story of a famous folk tale, the Thao Saen Pom Shrine, a tourist attraction, was built for tourists to worship and ask for blessings. The community has therefore connected it to cultural tourism products, such as bags, key chains, and various miscellaneous items and has adopted the symbol of the "gong" (i.e., drum) which is a musical instrument that strikes loudly as a symbol.

It was inserted with embroidery in the shape of an eggplant to connect with the story and inserted a picture of the pagoda at Wang Phra That Temple, which is an important tourist attraction in Trai Trung Subdistrict.

The CCT Model makes it evident that although these two communities had the different potentials and skills of the people in the communities, there were ways to use those potentials to connect with the cultural heritage of their own areas according to their understanding. Additionally, they could use those cultural capitals as inspiration to create cultural tourism products in various forms. This is the patterns and ways of thinking that occur naturally and in the way of the community. The use of the design thinking process helps in making the products more connected and influenced by customer needs according to the concept of Abraham, Howard & Asinyo (2022).

Also, from the community's model, it is also consistent with Cai, Lin & Zhang (2023) about the three steps in which design thinking can be implemented as fuzzy front end, development and testing, and commercialization. In other words, it is about considering problems and planning based on the community's potential, the design and development, the test based on the basis of cultural heritage, and the production and actual selling the products to tourists.

2. The results regarding Research Objective 2 aiming at developing community products using design thinking methods using the cultural heritage capital

Once the researchers obtained guidelines and ways of thinking about creating community products that were linked to the community's cultural heritage, which is the CCT Model, the researchers therefore interspersed it with design thinking activities that consisted of various tools as shown in Figure 3 in order to organise them and ways of thinking in developing community products based on the cultural heritage in their own areas of both communities.

The researchers analysed the results from organising activities with both communities using design thinking tools, following the 5-stage design thinking process, consisting of nine design thinking process tools, divided into nine activities, as shown in Figure 3.
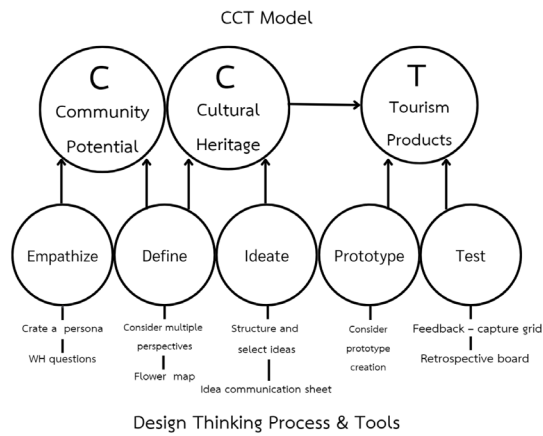
» **Figure 3:** *Bringing the design thinking process to link with the community's CCT Model*

Also, this included participatory observation with the community by three experts in design thinking in order to evaluate the design thinking process that occurred in the community in each activity in terms of participation of people in the community, solving problems, and developing ideas of people in the community. The overall analysis results for each design thinking tool can be summarised as shown in Table 1 below.

From Table 1, the results showed that the overall design thinking process in both communities were at a high level (x̄ = 3.76, S.D. = 0.79). The results can be classified according to the five design thinking stags and tools as follows.

As for the Empathize stage, the overall evaluation result was at a moderate level (x̄ = 3.35, S.D. = 0.68), and the tool "Creating a persona" revealed at a high level (x̄ = 3.63, S.D. = 0.61).

It was observed that the communities understood and analysed a character creation step by step. There were facilitators to stimulate the community and give advice in the process on certain issues. Both communities created fictional characters who were the same group of customers that needed to be taken into consideration, that is, government officials. They were the people with an age range of 30-40 years and above, with a salary of 25,000 - 30,000 baht. They were a group for which the government campaigned to have Thai cultural dress and use cultural products. They had the habit of liking beautiful products that conveyed meaning and had storytelling at a price that was not very high. In addition, in terms of the WH questions tool, the evaluation result was at a moderate level (x̄ = 3.17, S.D. = 0.66).

Table 1

The results of the evaluation of the community's design thinking process in order to develop products based on cultural heritage classified by design thinking stages and tools

Design thinking process	Tools	The level of results of the design thinking process for the product development based on cultural heritage					
		Community 1 Khlong Suan Mak Ban Nakhon Chum Community		Community 2 Ban Wang Phra That Trai Trung Community		The sum of the design thinking processes in both communities	
		x̄	S.D.	x̄	S.D.	x̄	S.D.
Empathize	Creating a persona	3.80	0.68	3.47	0.52	3.63	0.61
	Asking WH questions	3.33	0.70	3.00	0.59	3.17	0.66
Total						3.35	0.68
Define	Considering multiple perspectives	4.50	0.52	4.67	0.49	4.58	0.50
	Making a flower map	4.27	0.59	4.47	0.52	4.37	0.56
Total						4.46	0.54
Ideate	Structuring and selecting ideas	3.50	0.52	3.75	0.75	3.63	0.65
	Idea communication sheet	3.22	0.67	3.22	0.44	3.22	0.55
Total						3.45	0.63
Prototype	Considering prototype creation	3.80	01.08	04.07	0.80	3.93	0.94
Total						3.93	0.94
Test	Feedback – capture grid	3.96	0.62	3.67	0.56	3.81	0.61
	Retrospective board	3.78	0.83	3.56	0.73	3.67	0.77
Total						3.77	0.65
Total of all aspects		3.79	0.78	3.72	0.79	3.76	0.79

It was revealed that the facilitators must stimulate the communities on many issues that the communities still did not feel comfortable to ask questions about, for example, what the problems were and how to solve the problems. This is because most community members were considerate of community leaders and were careful in asking and answering questions. Most of the questioning and answering occurred from the group of the community leaders who opened the issue.

This makes it necessary to use the facilitators within the activities to help build confidence in the community to be more assertive. This is in line with Jobst et al. (2012) in building confidence, motivation, and the emotional state and expression of community groups and Gao & Yu (2023) in the design thinking of SMEs in that it is necessary to emphasize understanding of design thinking with the executives or community leaders first and focus on the participation of employees or community members.

In this present study, both communities had a consistent answer, namely, wanting to develop community products into tourism products with cultural value. They needed support from the government and related agencies in order to connect cultural capital and create story telling for products. The current problem arose from communities developing products and selecting cultural heritage as inspiration to create their own products without good advice in terms of design. Therefore, this problem should be solved from within the communities by creating various knowledge and promoting it in marketing to make community products outstanding.

As for the Define stage, the overall evaluation result was at a high level ($\bar{x}$ = 4.46, S.D. = 0.54). Regarding the tool "Considering multiple perspectives", the evaluation result was at the highest level ($\bar{x}$ = 4.58, S.D. = 0.50). This is because it is a brainstorming session based on the potential of the community and the cultural heritage that the community should had in connecting together by listening to suggestions and critiques with participation. This is consistent with Lake et al. (2024) who examined current research to understand the value and limitations of teaching design thinking that following a structured learning process, participating in active listening, and focusing on others' perspectives were the most valuable design thinking practices. Moreover, design thinking also encourages collaboration and project framing that emphasizes shared critical analysis.

From the observation results, it was found that both communities were able to carry out the procedures very well and were able to analyse data and present it themselves by offering cultural heritage in the communities, both in tangible and intangible forms from various perspectives, writing it on a large sheet of paper, and voting it together for appropriate cultural heritage. Moreover, the communities had a wide range of opinions.

That is, Community 1 selected the outstanding cultural heritage of the community, namely 1) Wat Phra Borommathat Nakhon Chum which is an important tourist attraction of the province, 2) Nopphra traditional music festival, 3) Kamphaeng Phet Historical Park, and 4) Miang, which is an ancient local food of the community, respectively. Community 2 selected the outstanding cultural heritage of the community, which is 1) the folk tale of Thao Saen Pom and 2) the pagoda at Wang Phra That Temple which is important tourist attractions of the community, respectively.

In terms of the flower map tool, the evaluation result was at a high level ($\bar{x}$ = 4.37, S.D. = 0.56). The communities determined together the key development issues that were equally important and removed unimportant issues by brainstorming and writing on flower-shaped paper. The communities could do well by having facilitators to stimulate sometimes. Both communities had identified five consistent product development issues, which could be summarised as follows. First, the products must be connected to the story and culture of the community. Second, the product must be connected to community tourism. Next, the products must be created by the community participating in thinking and being the identity of the community. Fourth, the products must be suitable for marketing and having markets to support it. Finally, the products must be of high quality and attractive to tourists.

As for the Ideate stage, the overall evaluation result was at a moderate level ($\bar{x}$ = 3.45, S.D. = 0.63). The tool "Structuring and selecting ideas" revealed at a high level ($\bar{x}$ = 3.63, S.D. = 0.65). The results from the observation showed that both communities were able to carry out the steps well. The facilitators must stimulate the communities and encourage people in the communities to express themselves in drawing and proposing ideas for developing products linked to the cultural heritage that were selected in the previous process. From the conclusion of products that met the needs of the community, the Community 1 defined their products for linking cultural heritage, consisting of 1) wooden table lamps, 2) handle bags, and 3) key chains of miniature food replicas (i.e., Miang). The Community 2 defined their products, consisting of 1) Thai traditional round-neck sleeveless collar shirts, 2) shoulder bag, and 3) a gong-shaped key chain from the story of Thao Saen Pom. In terms of the tool "Idea communication sheet", the evaluation result was at a moderate level ($\bar{x}$ = 3.63, S.D. = 0.65). The communities were pushed and courage to express themselves by the process. From linking products and cultural heritage in designing the sketch, it was found that both communities still did not feel comfortable to express themselves about painting since they were shy and afraid that it would be beautiful and not the same as what they thought. Therefore, this had to rely on the facilitators to help guide and encourage them throughout the painting.

As for the Prototype stage, the overall evaluation result was at a high level (x̄ = 3.93, S.D. = 0.94). By the tool "Considering prototype creation", from the observation, it was found that both communities were able to create product prototypes linked to cultural heritage from the Define and Ideate stages very well, with the facilitators stimulating thinking on certain issues. The Community 1 had graphics work related to the Nopphra traditional music festival and Kamphaeng Phet Historical Park to be used with wooden table lamp products and a handle bag. Also, key chains of miniature food replicas were designed using a local food model (i.e., Miang) to help create a story along with a model "Kluai khai" (i.e., lady finger banana) which was famous fruit of the province. The Community 2 had the story of Thao Saen Pom to convey as embroidery-knitting in the shape of a "gong" (i.e., drum) which is a symbol of a musical instrument that strikes loudly, corresponding to the story of the magic drum of Thao Saen Pom. In addition, there was sewing cloth into the shape of an eggplant and an eggplant flower to represent Thao Saen Pom. The focus was on the products related to the belief in good fortune for users. Both communities participated in improving the sketches continuously and developing the prototypes at least twice until they were suitable. These products are shown in Figures 4-5 below.

» **Figure 4:** *The developed community products of Communities 1 using a design thinking process linked to cultural heritage 1) wooden table lamps, 2) handle bags, and 3) key chains of miniature food replicas (Miang)*

» **Figure 5:** *The developed community products of Communities 2 using a design thinking process linked to cultural heritage 1) Thai traditional round-neck sleeveless collar shirts, 2) shoulder bag, and 3) a gong-shaped key chain from the story of Thao Saen Pom*

From Table 1, as for the Test stage, the overall evaluation result was at a high level (x̄ = 3.77, S.D. = 0.65). For the tool "feedback – capture grid", the result was at a high level (x̄ = 3.81, S.D. = 0.61). Regarding the observation, it was found that, from organising exhibitions and

selling products at the Nakhon Chum Cultural Market, both communities were able to evaluate feedback from tourists and interested parties well by having facilitators stimulating the interviews with buyers sometimes. There were consistent results in both communities that, in terms of tourists' preferences, they liked handicrafts from the communities. However, the tourists would like it to have a lower price than this. Tourists' purchasing needs therefore were on the cheapest products which were the key chains from both communities. There were questions asked directly to the communities about the products' storytelling regarding the origins of the cultural heritage that were conveyed on the products. There were also suggestions regarding the product design and development to be more diverse in terms of color, size, and placement of graphic elements on the products.

In terms of the tool "retrospective board", the evaluation result was at a high level (x̄ = 3.67, S.D. = 0.77). From the observation, it was found that the communities could evaluate the design thinking process from the beginning. However, the communities were considerate of each other in writing information on large sheets of paper.

Therefore, the facilitators must help to build confidence in presenting their opinions. The results from the retrospective boards of both communities were consistent in the matter of what was very useful in the process which was the tool in the Define and Ideate steps, especially considering multiple perspectives. That allowed the communities to brainstorm and select cultural heritage. This made them see the missing cultural heritage and create pride in the communities. Both communities would like to proceed design thinking since they found that it was beneficial in developing their future products, especially the Test stage where community leaders and members would like to have sales trials in many areas to collect feedback from buyers and tourists further.

This is consistent with the study conducted by Abraham, Howard & Asinyo (2022) showing that the entire process is connected and influenced by the customers and interaction with customers to solve problems and develop products creatively. Also, this supports Carella et al. (2023) who demonstrate the sensitivity of entrepreneurs to change and awareness of the benefits and capabilities of design thinking in that it is not only as part of product design and development, but it is also with the building of a specific design mindset.

From the results of assessing the community's design thinking process in order to develop the products based on cultural heritage, classified by design thinking stages and tools, the researchers chose nine design thinking tools from the study of design thinking tools by Lewrick, Link & Leifer (2018) and applied them to the communities to create a systematic thinking process and help in making the products more connected

to and influenced by customer needs according to the concept of Abraham, Howard & Asinyo (2022).

3. The results regarding Research Objective 2 aiming at assessing tourist satisfaction towards community products based on cultural heritage

It was found that, after having community products that were jointly developed using a design thinking process linked to the cultural heritage, such products were introduced and brought them to an exhibition and trial sales at the cultural market, which was a cultural tourist spot, in order to disseminate to a group of 100 tourists. The data were then collected using online assessments in order to assess tourist satisfaction according to the five aspects as shown in Table 2 below.

From Table 2, it was found that the results of the tourist satisfaction assessment with the community products that were developed with a design thinking process linked to the cultural heritage base of both communities, overall, was at a high level ($\bar{x}$ = 4.12, S.D. = 0.64). The aspect that revealed the highest satisfaction was connection with cultural heritage ($\bar{x}$ = 4.16, S.D. = 0.55).

This shows that the communities can use design thinking processes to design and develop the products based on cultural heritage. This is in line with Seidel & Fixson (2013) who mentioned about the participation in using design thinking with interdisciplinary groups in that even though each group member has different aptitudes and main occupations, they can work together to create work through the design thinking process.

It was followed by product quality ($\bar{x}$ = 4.15, S.D. = 0.58), linking to tourism ($\bar{x}$ = 4.14, S.D. = 0.72), value based on identity and cultural heritage ($\bar{x}$ = 4.07, S.D. = 0.65), and marketing ability ($\bar{x}$ = 4.05, S.D. = 0.72), respectively.

It was suggested that there should be marketing promotion to make the products more well-known, and the products should be more contemporary.

From the evaluation of all five aspects, it is consistent with Li, Ho & Yang (2019) who studied the use of design thinking in the sustainable development of traditional handicrafts which defined four value dimensions, namely, 1) material and innovative value, 2) handicraft and cultural value, 3) empirical and local value, and 4) sharing and interactive value.

In this regard, the sustainable development of handicrafts or community wisdom products also contributes to design thinking's sustainable development model, business model, product design and development, and various innovations according to the concepts of Andrews (2015), Elsbach & Stigliani (2018), and Geissdoerfer, Bocken & Hultink (2016).

Table 2
The results of tourists' satisfaction assessment towards community products that have been developed with a design thinking process linked to cultural heritage

| Five aspects of the assessment | The product of Community 1 | | | | | | The product of Community 2 | | | | | | The sum of the assessment of the products of both communities | |
| | Wooden table lamp | | Handel bag | | Key chains of miniature food replicas (Miang) | | Thai traditional round-neck sleeveless collar shirts | | Shoulder bag | | A gong-shaped key chain from the story of Thao Saen Pom | | | |
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Connection with tourism	3.82	0.72	3.96	0.70	4.39	0.62	3.80	0.78	4.29	0.50	4.56	0.58	4.14	0.72
Connection with cultural heritage	4.10	0.62	4.15	0.48	4.08	0.45	4.17	0.61	4.25	0.58	4.21	0.54	4.16	0.55
Value based on identity and cultural heritage	3.95	0.63	3.98	0.74	3.81	0.68	4.22	0.60	4.19	0.60	4.30	0.50	4.07	0.65
Marketing ability	3.38	0.73	3.85	0.66	4.51	0.55	4.00	0.50	4.07	0.59	4.52	0.55	4.05	0.72
Product quality	4.13	0.56	4.06	0.54	3.96	0.62	4.04	0.52	4.18	0.54	4.53	0.54	4.15	0.58
Total mean	3.91	0.70	04.01	0.63	4.13	0.64	4.04	0.62	4.19	0.56	4.44	0.56	4.12	0.64

Conclusion

From studying community products towards the development of product potential for tourism on the basis of cultural heritage, the results of area visits and interviews with leaders and representatives in community groups, including following up on the process of creating cultural products of the two communities, which were outstanding cultural tourism communities in the province leads to the CCT Model. From the CCT Model, it was found that the two communities, despite having different potentials and skills of the people in the communities, had ways to use those potentials to connect with the cultural heritage of their own areas according to their understandings.

This is consistent with the Design Thinking Model proposed by Hasso Plattner Institute of Design at Stanford University (2010). According to the five stages of design thinking in the traditional community thinking process, the Empathize and Define stages are consistent with C (Community Potential) which is a stage in studying and understanding the potentials of the communities in various areas and determining perspectives and directions in developing community products. The Define and Ideate steps are consistent with C (Cultural heritage), which is the stage from defining perspectives and creating concepts/ideas linked to cultural capital in their own areas. The Prototype and Test stages correspond to T (Tourism products), which are the stages to create product prototypes linked to cultural heritage and test the market. Table 3 below shows the relationship among the CCT Model, the five stages of design thinking, and design thinking too.

Table 3

The relationship among the CCT Model, the five stages of design thinking, and design thinking tools

CCT Model	The five stages of Design Thinking	Design thinking tools
C: Community Potential	Empathize	Creating a persona
		Asking WH questions
	Define	Considering multi perspectives
		Making a flower map
C: Cultural heritage	Ideate	Structuring and selecting ideas
		Idea communication sheet
T: Tourism products	Prototype	Considering prototype creation
	Test	Feedback – capture grid
		Retrospective board

From Table 3, it can be seen that the Define stage of the five stages of design thinking is a stage that connects C (Community Potential) and C (Cultural heritage) because it defines perspectives and the

connection between the potentials of the communities that has with the cultural capital that communities have. This leads to creating ideas together.

Recommendations

This present study employed document research and nine tools/activities in the design thinking stages. However, there are many other design thinking tools used in each stage. Therefore, the recommendation is that the further research can apply and change to other design thinking tools according to the suitability and potentials of the community groups.

Also, the recommendation for the product evaluation section is that the products should be promoted in marketing and publicising the product to be known to tourists before the evaluation. It is because they are the products that are connected to the cultural heritage and are presented in a new way and different from the community's original products. Therefore, there should be the transfer of the concept and the story of the product design and development to tourists in order to create understandings about the connection between cultural heritage and the products.

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