

# THE COLLECTION OF IDENTITY PATTERNS AND THE DEVELOPMENT OF THE POTTERY PATTERN STAMPING ROLLERS OF BAN NA WAT LAI COMMUNITY IN SUKHOThai PROVINCE, THAILAND

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## ABSTRACT

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This research aimed to 1) study the identity of the imprinted patterns on pottery of the Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, SukhoThai Province, 2) design the pottery pattern stamping rollers, and 3) propose guidelines for developing the pottery pattern stamping rollers of Ban Na Wat Lai Community, Thailand. The researchers studied documents and research related to the collection of pattern identities and the development of the pottery pattern stamping rollers in the Ban Na Wat Lai Community, surveyed data on attitudes and needs regarding the development of the pottery pattern stamping rollers, designed the pottery pattern stamping rollers using 3D models, produced a prototype of the pottery pattern stamping rollers using 3D printing technology, and evaluated the pottery pattern stamping rollers' development using a questionnaire on opinions toward the development of the pottery pattern stamping rollers of the Ban Na Wat Lai Community. The data were then analyzed by calculating the mean and standard deviation of the questionnaire. The sample group was 30 pottery producers in the Ban Na Wat Lai Community. The data analyzed revealed that Model 3 of the pottery pattern stamping rollers achieved the highest ranking. This is because, at the selection stage, it has beautiful patterns; during application, it creates sharp patterns on pottery; and throughout use, it offers a comfortable handle. The study's findings and suggestions for further research are also discussed.

**Keywords:** Cultural identity; identity patterns; pottery pattern stamping rollers; SukhoThai Province

## 1. INTRODUCTION

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is one of the first organizations to protect and value intangible cultural heritage, including craftsmanship, and handicrafts. The identity of pottery patterns is considered part of intangible cultural heritage (ICH), defined as the practices, expressions, ideas, knowledge and skills of communities, groups, or even individuals who recognize they are

part of that cultural heritage. It emphasizes the role of patterns in reflecting the identities of communities, beliefs, and ways of life, and in the transmission of knowledge from generation to generation. There is a continuous creation in relation to the environment, nature, and their history, leading to the identity and continuity of culture, which is an approach that supports respect for cultural diversity and human creativity (Sarawasi, 2013). As shown in Angeli's (2024) study, the patterns and forms that recur across regions are not only artistic elements but also reflect social boundaries and sincerely convey the specific identities of past groups. The patterns on pottery not only reflect the cultural identity of each region but also connect different communities through the exchange of ideas, styles, and beliefs embedded in local art (Shott, 2018). Phruksawan and Suwanpratest (2015) noted that pottery, as a folklore, plays a vital role in Thai society in four ways: 1) as tools that facilitate daily life, 2) as a symbol of the identity of the group, 3) as a material carrier that connects humans with the supernatural dimension, and 4) as a source of learning for the younger generation to study the social culture and way of life of Thai people in the past.

Ban Na Wat Lai Community is a village, located in Moo 2, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province, Thailand, and is famous for pottery, a local handicraft passed down from ancestors. The pottery produced in this community comes in different shapes, reflecting each household's expertise, and often decorated with patterns.

Although pottery has evolved with the times and reflects Thai society's ability to attract interest and encourage tourists to seek it out, some aspects of modern pottery retain their original identity. According to Thongjaem et al. (2018), the local wisdom and traditions of producing pottery in the Ban Thung Luang Community, shaped by current social factors and conditions, are on the verge of disappearing. This possibility also includes the imprinted patterns on pottery of the Ban Na Wat Lai Community. Most of the patterns found on this community's pottery are beautifully decorated with pattern rollers, resulting in stunning patterns. Using patterns on a roller to decorate pottery containers not only looks beautiful but also saves time on drawing. It reproduces the original's quality, enabling the mass production of repeated patterns. Grandpa Noi, the person who invented the pattern roller tool on pottery of the Ban Na Wat Lai Community, is currently 85 years old. He still makes the pattern stamp rollers in the community, as shown in Figure 1 below, but there is no one to inherit this wisdom. Although research exists on Ban Thung Luang pottery, there is a lack of studies on the patterns created by the pottery stamping rollers of Ban Na Wat Lai Community. The lack of effort to pass down or preserve this knowledge is likely to adversely affect the community's pottery production.



**Figure 1:** Images showing Grandpa Noi and the pottery pattern stamping rollers of Ban Na Wat Lai Community

The researchers therefore recognized the importance of the patterns created by the pottery stamping rollers of Ban Na Wat Lai Community, which are at risk of disappearing due to the lack of artisans to inherit the knowledge of their creation. Also, the researchers were interested in studying and identifying patterns. The research aimed to strengthen the pottery pattern-stamping rollers of the Ban Na Wat Lai Community, develop handles to make them easier to grip, and create consistent patterns to make them look more beautiful. Ultimately, these efforts seek to preserve this technology before it is lost to time. In addition, the researchers were interested in studying and inheriting the imprinted patterns found on the pottery of the Ban Na Wat Lai Community, Thailand. The hope is that these efforts will benefit the community and lead to sustainable development, in line with the strategic policy framework of Higher Education, Science, Research, and Innovation 2023–2027, which aims to upgrade society and the environment for sustainable development (Ministry of Higher Education, Science, Research and Innovation, 2022).

## 2. RESEARCH OBJECTIVES

The present research has three main objectives:

1. To study the identity of the imprinted patterns on pottery of Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province
2. To design the pottery pattern stamping rollers of Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province
3. To propose guidelines for developing the pottery pattern stamping rollers of Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province

## 3. RESEARCH METHODOLOGY

### 3.1 Population and sample

The population consisted of 766 people aged 30–60 years and older, both males and females, producing pottery from more than 200 households in Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province (Department of Health Service Support data as of April 2025, regarding Ban Na Wat Lai Community (Village Moo. 2), Thung Luang Sub-district, Khiri Mat District, Sukhothai Province).

The sample group consisted of 30 people aged 30–60 years and older, both male and female, who were pottery producers in the Ban Na Wat Lai Community, and were selected by using purposive sampling. Regarding ethical issues, this research was reviewed and approved by the Institutional Review Board (IRB), (IRB No. P2-0098/2567). At every stage, the participants' names remained confidential, and the results of this study would be used for academic purposes only.

### 3.2 Research instruments

In this study, three sets of research instruments were used to collect data:

- 1) A questionnaire on attitudes and needs regarding the development of a roller tool for stamping patterns on pottery, Ban Na Wat Lai Community.
- 2) A questionnaire on opinions regarding the design of the pottery pattern stamping rollers of Ban Na Wat Lai Community.
- 3) A questionnaire on opinions regarding the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community.

### 3.3 Data collection

First, the researchers studied documents and related research and collected preliminary data by reviewing literature, analyzed documents, conducting research, and examining concepts, theories, and related research. In addition, the researchers studied data on the collection and development of pottery pattern stamping rollers in the Ban Na Wat Lai Community, using documents such as records, textbooks, books, and journals to learn about the methods and techniques for studying, to present guidelines for the continued development of pottery pattern stamping rollers for the Ban Na Wat Lai Community, meeting the needs of pottery producers. The contents were as follows: 1) documents and research on Ban Na Wat Lai Community, 2) documents and research on pattern identity design on pottery, 3) documents and research on pattern-stamping tools, 4) documents and research on ergonomic principles, 5) documents and research on mechanics principles, 6) documents and research on materials and production methods, and 7) related documents and research.

Next, data from literature reviews, preliminary data from documents, and research on concepts, theories and related research contributed to the development of a questionnaire. Experts then assessed the questionnaire to determine the Index of Item-Objective Congruence (IOC) (Turner & Carlson, 2003). Also, the quality of the research instruments was checked until they met the requirements. The researchers then visited the area to study and identify the patterns on pottery from the Ban Na Wat Lai Community, and created patterns by drawing in a graphic design program. Then, 30 pottery producers were asked for information on their attitudes and needs regarding the development of the pottery pattern-stamping rollers in Ban Na Wat Lai Community.

The researchers then developed pottery pattern-stamping rollers for the Ban Na Wat Lai Community using a 3D model. The pottery pattern stamping rollers of Ban Na Wat Lai Community were then evaluated by five experts in graphic design, product design, or related fields. The pottery pattern-stamping rollers for Ban Na Wat Lai Community were developed using 3D printing technology. The development of the pottery pattern-stamping rollers was then evaluated by pottery producers in the Ban Na Wat Lai Community. The obtained data were then analyzed, summarized, and discussed to propose guidelines for the development of pottery

pattern-stamping rollers for the Ban Na Wat Lai Community. The research results were then written as a report and disseminated.

### 3.4 Data analysis

The statistics used for analyzed were selected based on the data's characteristics to answer the research objectives as follows.

1) The data on attitudes and needs on the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community were analyzed by calculating the frequency distribution and percentage (%).

2) The data on opinions on the design of the pottery pattern stamping rollers of Ban Na Wat Lai Community were analyzed by calculating the mean ( $\bar{x}$ ) and standard deviation (S.D.).

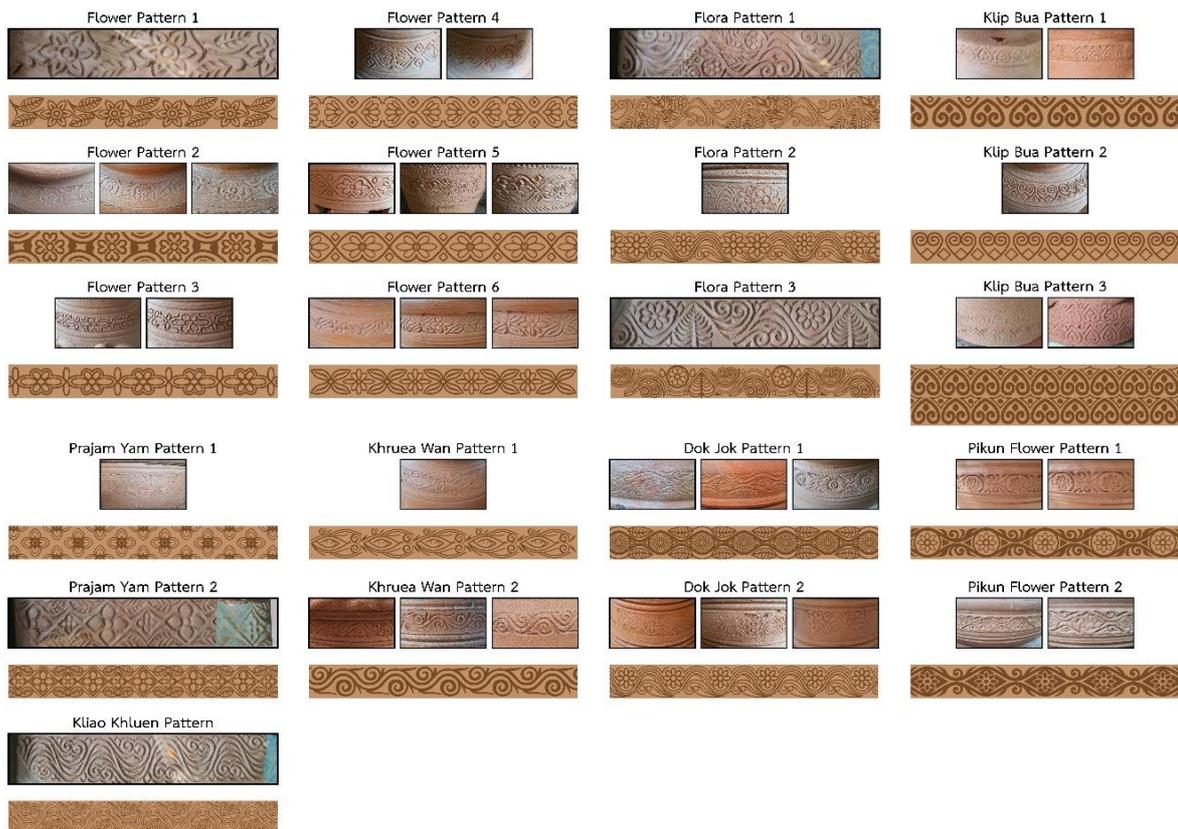
3) The data on opinions on the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community were analyzed by calculating the mean ( $\bar{x}$ ) and standard deviation (S.D.).

## 4. RESULTS

The results of this study are presented in three phases according to the research objectives as follows.

**Phase 1:** The results of the study of the identity of the imprinted patterns on pottery of the Ban Na Wat Lai Community are divided into two parts as follows.

Part 1: As for the results of pattern identity collection and the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community, the researchers collected pattern identities and drafted patterns from patterns on pottery products of Ban Na Wat Lai Community using a graphic drawing program. It was found that the various patterns created were the result of the pottery producers' self-learning. They used the rhythm of lines in nature and the environments they encountered in their daily lives as inspiration for creating artwork with pottery pattern-stamping rollers. Most of the pottery makers were inspired by various types of plants and flowers that were planted and naturally grew, as shown in Figure 2.



**Figure 2:** Images showing the collection of pattern identity, drawing a pattern from the pattern on the pottery product in Ban Na Wat Lai Community

Part 2: The results of data analyzed on attitudes and needs regarding the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community are as follows.

1) Regarding the type of pottery products that tourists were most interested in buying, it was found that most people thought it was pottery for decorating the home and garden (73.3%), followed by pottery for household use (26.7%).

2) Regarding the pattern on pottery that tourists were most interested in buying, it was found that it was the Khrua Wan pattern (33.3%), followed by the flower pattern (26.7%) and the flora pattern (10%) respectively.

3) Regarding the importance of the pottery pattern stamping rollers, it was found that the majority agreed that the pottery pattern stamping rollers were necessary tools (46.7%).

4) Regarding the creation of patterns on pottery of the Ban Na Wat Lai Community in terms of the identity that should be used as guidelines for designing the pattern, it was found that most people would like it to communicate natural identity (56.7%), followed by cultural identity (23.3%) and the identity from animals and living things (3.3%), respectively.

5) Regarding the creation of patterns on pottery in the Ban Na Wat Lai Community, it was found that the majority of people thought that the patterns should be less real or semi-formal (60%), followed by wanting the patterns to look simple, informal, and international (40%).

6) An additional suggestion for collecting pattern identities and developing the design of the pottery pattern stamping rollers of Ban Na Wat Lai Community revealed that the design should have multiple sizes (6.6%).

**Phase 2:** The results of the design of the pottery pattern stamping rollers of Ban Na Wat Lai Community are shown in Figure 3.



**Figure 3:** Three (3D) models of the pottery pattern stamping rollers of Ban Na Wat Lai Community

As shown in Figure 3, the researchers designed pottery pattern stamping rollers with different roller head structures. The researchers created a 3D model for three models to elicit opinions on the design of the potter pattern stamping rollers for Ban Na Wat Lai Community from experts in graphic design, product design, or related fields. They were lecturers at Naresuan University. The results of the data analyzed are shown in Table 1.

**Table 1:** A summary of the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community

No.	Evaluation criteria	Model 1		Model 2		Model 3	
		$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
1.	Beauty	3.20	0.45	4.40	0.55	4.20	0.45
2.	Strength and durability	2.80	0.45	5.00	0.00	4.40	0.55
3.	Handle design	3.20	0.45	3.20	0.45	3.20	0.45
4.	Convenience and ease of use	5.00	0.00	4.40	0.55	3.00	0.00
5.	Being able to be applied and used in practice	4.20	0.45	4.20	0.45	4.20	0.45
6.	Overall suitability of these prototypes	3.60	0.55	4.60	0.55	4.40	0.55
Total average		3.67	0.39	4.30	0.43	3.90	0.41
Ranking		3		1		2	
Suitability level		High		High		High	

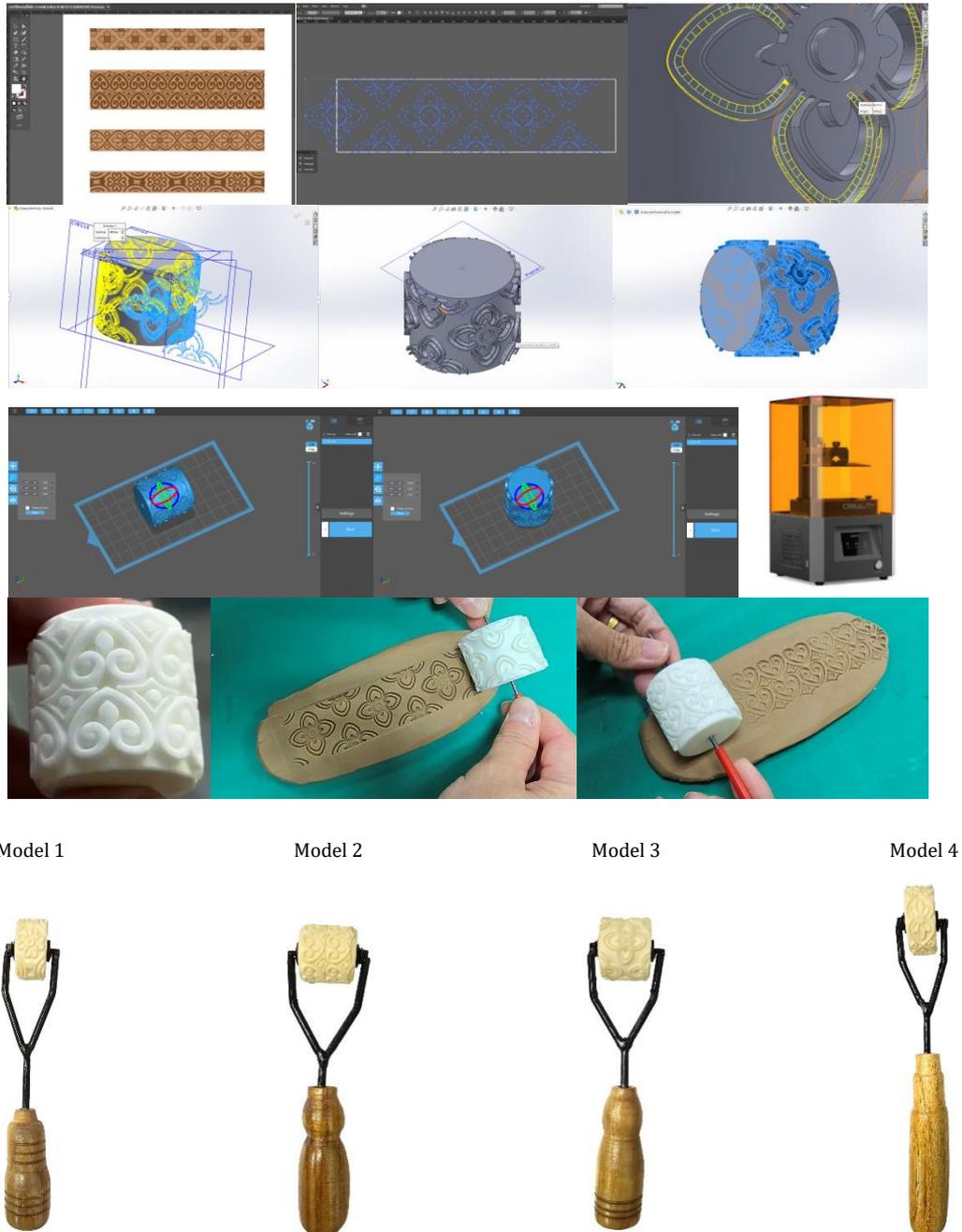
**Score range: Interpretation**

**4.50–5.00:** The highest level of appropriateness; **3.50–4.49:** A high level of appropriateness; **2.50–3.49:** A moderate level of appropriateness; **1.50–2.49:** A low level of appropriateness; **1.00–1.49:** The lowest level of appropriateness

From Table 1, it was found that Model 2 ranked first at a very high level of suitability ( $\bar{x} = 4.30$ , S.D. = 0.43). It was followed by Model 3 at a very high level of suitability ( $\bar{x} = 3.90$ , S.D. = 0.41) and Model 1 at a very high level of suitability ( $\bar{x} = 3.67$ , S.D. = 0.39).

Additional suggestions for the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community were that 1) the prototype should be designed to be simple, easy-to-use, and uncomplicated, 2) the handle should be designed in various sizes, the prototype should be designed by increasing the number to four structures and four graphics, and 4) the prototype should follow the attitudes and needs on the development of the pottery pattern stamping rollers of the Ban Na Wat Lai Community. Flower patterns, lotus petal patterns, and Pra Jam Yam patterns were used to produce the prototype. As for the Khruera Wan pattern, no prototype was chosen since almost every pottery producer already produces a large number of Khruera Wan patterned pottery. Creating other patterns would be an alternative for further product evaluation.

**Phase 3:** The results of the suggestions for guidelines for developing the pottery pattern stamping rollers of Ban Na Wat Lai Community are shown in Figure 4.



**Figure 4:** The prototype of the development of four types of pottery pattern stamping rollers

Based on Figure 4, the researchers developed pottery pattern stamping rollers according to the experts' recommendations. There were differences in 1) the size of the handle and roller head, 2) the number of 4 structures, 3) the number of four graphics, 4) the width and length of the pattern, and 5) the thickness of the pattern. The production technique was 3D printing technology with four models. The results of the data analyzed are shown in Table 2.

**Table 2:** A result summary of the development of the pottery pattern stamping rollers Models 1–4

No.	Evaluation criteria	Model 1		Model 2		Model 3		Model 4	
		$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
1.	Beauty	4.83	0.38	4.77	0.43	4.87	0.35	4.80	0.48
2.	Strength and durability	4.70	0.47	4.73	0.45	4.77	0.43	4.70	0.47
3.	Ease of use	3.87	0.94	3.83	0.95	3.87	0.94	3.83	0.91
4.	Being convenient to grip and tighten the hand	3.77	1.07	3.77	1.07	3.77	1.04	3.73	1.01
5.	The quality of the stamped pattern	4.43	0.73	4.47	0.73	4.50	0.73	4.40	0.77
6.	Being able to be applied and used in practice	4.70	0.47	4.70	0.47	4.73	0.45	4.70	0.47
Total average		4.38	0.68	4.38	0.68	4.42	0.66	4.36	0.69
Ranking		2		2		1		3	
Suitability level		High		High		High		High	

From Table 2, it was found that Model 3 was in the first rank at a very high level of suitability ( $\bar{x} = 4.42$ , (S.D. = 0.66). The pottery producers mentioned that it was the most suitable because the pottery pattern stamping roller Model 3 had the highest mean compared to other models in terms of 1) beauty ( $\bar{x} = 4.87$ , S.D. = 0.35), 2) strength and durability ( $\bar{x} = 4.77$ , S.D. = 0.43), 3) the quality of the stamped pattern ( $\bar{x} = 4.50$ , (S.D. = 0.73), and 4) being able to be applied and used in practice ( $\bar{x} = 4.73$ , S.D. = 0.45). As for ease of use, grip, and hold, the pottery producers found it as suitable as other models.

## 5. DISCUSSION AND CONCLUSION

Important findings can be summarized and discussed in accordance with the research objectives as follows.

1. As for studying the identity of the pottery pattern stamping rollers of Ban Na Wat Lai Community, it was found that the pottery producers, both male and female, aged 30–60 years and over, provided information on attitudes and needs regarding the development of the pottery pattern stamping rollers of Ban Na Wat Lai Community. Regarding the types of pottery products, tourists were most interested in buying. It was revealed that most thought it was pottery for decorating houses and gardens. They were interested in Khrua Wan patterns. The design guidelines for patterns, should convey the identity of nature. This is also in line with Inthawong (2020), who notes that identity refers to the unique characteristics that define an individual, society, community or country, such as race, language, local culture and religion, and which are not general or universal to other societies. In other words, it is a characteristic unlike that of other people.

2. As for the design of the pottery pattern stamping rollers of Ban Na Wat Lai Community, the results showed that experts in graphic design, product design, and other related fields agreed that the 3D model of the pottery pattern stamping roller Model 2 was appropriate for creating a prototype of the stamping roller tool because it was beautiful, strong, durable, and overall appropriate for the prototype of the stamping roller tool. Additionally, the pottery producers provided the following suggestions.

Firstly, the prototype should be simple, easy to use, and uncomplicated. It should be designed with handles of various sizes to be suitable for use in accordance with ergonomic principles. This recommendation is consistent with Theptrakarnporn (1999), who found that applying ergonomics principles to develop and improve working conditions would help reduce harm to the skeletal and muscular systems, reduce work-related hazards, and enhance the quality of work and efficiency. The application of ergonomic knowledge plays an important role in promoting efficiency, safety, and comfort at work, encompassing the design, improvement, and development of the work environment, workload management, the selection of appropriate tools, and work postures. This is to increase efficiency, reduce errors, boost productivity, and improve workers' long-term quality of life. Also, this supports the research of Fuller (1994, as cited in Chumket, 2017), revealing that, regarding product development, product development steps would involve finding production methods, selecting raw materials, product components, production formulas, production methods to achieve quality, efficiency, styles, colors, and sizes according to market demands. Many concepts cannot be produced due to high costs or long timelines. This aligns with Inthip (2012), who found that products in demand in the market

were fine-art pottery works. The results of the study suggest the guidelines for applying pottery handicrafts to community identity. To be suitable for the current era and market, five design and development concepts must be considered: 1) local characteristics, 2) beauty, 3) utility, 4) size and proportion, and 5) production methods.

3. Regarding the guidelines for developing the pottery pattern stamping rollers of Ban Na Wat Lai Community, it was found that pottery producers agreed that the prototype of the 3D resin material of the pottery pattern stamping roller Model 3 was appropriate and could be used for real production because it was beautiful, strong, and durable. Moreover, the stamped pattern was clear and could be used for real applications. This is consistent with the research of Wongnet (2013), who found that, in developing a pattern stamping tool, the best pattern stamping tool must easily stamp patterns and produce clear patterns. In addition, when used to decorate the work, the tool must be durable and capable of producing multiple pattern-stamping tools quickly and conveniently. Moreover, resin materials are better for stamping patterns than other materials. They can also produce pattern-stamping tools numerous times, making them convenient and fast, and they can be used to stamp patterns without distorting the original pattern. They are also quicker and more convenient to produce tools than other types of materials. This goes parallel with the study by Sarawasi (2013), showing that the identity of the pattern on pottery is considered part of the intangible cultural heritage, meaning the practices, expressions, ideas, knowledge, and skills of communities, groups of people, or even individuals who are aware of their cultural heritage. Patterns play an important role in reflecting the community's identity, beliefs, ways of life, and the transmission of knowledge from generation to generation. There is continuous creation related to the environment, nature, and their history, which leads to the identity and continuity of culture. This aligns with UNESCO, which notes that it is an approach that supports respect for cultural diversity and human creativity. This supports the research of Ramadan (2024), who found that the sharpness of the tool is vital for creating patterns on pottery because it helps pattern lines be more precise and detailed. Tools designed to be easy to grip and comfortable will help reduce fatigue, allowing the craftsman to work longer and control the pattern accurately. This supports the findings of Bai et al. (2025), who found that digital technology plays an essential role in restoring and revitalizing traditional patterns to better suit contemporary tastes. Tools such as design software and 3D printers enable the production of complex and customized patterns. This is also consistent with the research conducted by Zhigang and Hu (2023), who revealed that, in pottery design, the application of digital software to decorate contemporary pottery and the use of digital tools to shape or create pottery models result in the development of new approaches to creating pottery art that are in line with the current era, increasing the potential for more accurate design and allowing artists to experiment or communicate creative ideas more freely.

All in all, this collected information should be helpful in society and the community, providing artistic insights for those who are interested and aware of the importance of inheriting and preserving the community's identity.

## 6. SUGGESTIONS

### 1. Suggestions for applying the research results

Those interested can apply to collect pattern identities and develop pottery pattern-stamping rollers for Ban Na Wat Lai Community, Thung Luang Sub-district, Khiri Mat District, Sukhothai Province. The guidelines for collecting pattern identities and developing pottery pattern-stamping rollers, derived from this research, can be applied to developing pattern-stamping roller tools appropriate for pottery producers in different contexts and conditions. This can be further developed to increase income for pottery producers and distribute income to the community.

### 2. Suggestions for future research

For those who are interested in applying the research results of this study, some additional variables related to the development of the pottery pattern stamping rollers should be studied and analyzed, such as the type, shape, size of the pottery, production budget, production techniques, production materials, physiology, methods, and postures while stamping patterns on the pottery to obtain pottery pattern stamping rollers that meet the needs of pottery producers.

## DECLARATION

### 1. Conflict of interest

The authors declare no conflict of interest.

### 2. Generative AI and AI-assisted technologies in the writing process

The authors declare that no generative AI or AI-assisted technologies were used in the writing of this manuscript.

### 3. Data availability statement

No new data were generated or analyzed in this study. All data derive from published sources included in the systematic literature review.

### 4. Ethics statement

The research work involves samples; there approval of the ethics for the approved by the Human Research Ethics Committee (HREC), Naresuan University. The certificate of approval number IRB No. P2-0098/2567; date of approval 11 June 2024 and confirmed that informed consent was obtained from participants.

### 5. Funding

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### 6. Contributor Role Taxonomy (CRediT)

Waraporn Mamee: Conceptualization, Formal analyzed, Methodology, Investigation, Supervision, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

Ruttiporn Leepanuwong: Writing – review

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