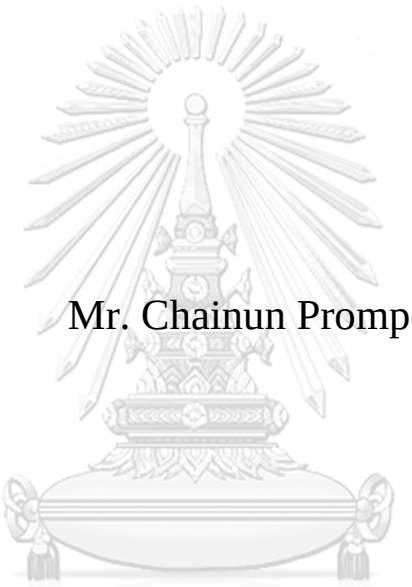
CO-CREATING BUILT ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT: A CASE STUDY OF BAN MOH, MAHASARAKHAM PROVINCE

Mr. Chainun Prompen



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การร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างเพื่อการพัฒนาที่ยั่งยืน: กรณีศึกษาชุมชนบ้านหม้อ จังหวัดมหาสารคาม

นายชัยนันท์ พรหมเพ็ญ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรดุษฎีบัณฑิต
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By	Mr. Chainun Prompen
Field of Study	Environment, Development and Sustainability
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ชัยนันท์ พรหมเพ็ญ : การร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างเพื่อการพัฒนาที่ยั่งยืน: กรณีศึกษาชุมชนบ้านหม้อ จังหวัดมหาสารคาม. (CO-CREATING BUILT ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT: A CASE STUDY OF BAN MOH, MAHASARAKHAM PROVINCE) อ.ที่ปรึกษาหลัก : อ. ดร.นฤมล อรุโณทัย

การร่วมคิดร่วมทำมีการนำไปใช้อย่างกว้างขวางในหลายสาขารวมถึงการออกแบบนวัตกรรม การออกแบบบริการและการพัฒนาย่าน ในประเทศไทยโครงการพัฒนาจำนวนมากได้ประยุกต์ใช้การร่วมคิดร่วมทำเป็นแนวทางในการพัฒนา อย่างไรก็ตามความรู้เชิงวิชาการเกี่ยวกับการร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างในประเทศไทยนั้นมีจำกัด และยังไม่ชัดเจน ดังนั้นการศึกษาครั้งนี้มีวัตถุประสงค์เพื่อทำความเข้าใจกระบวนการและวิธีปฏิบัติในการร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างเพื่อการพัฒนาที่ยั่งยืนในบริบทของประเทศไทยผ่านการบรรยายและวิเคราะห์กรณีศึกษา เพื่อระบุปัจจัยความสำเร็จที่สำคัญ ปัญหาและอุปสรรคในการดำเนินการตามแนวคิดการร่วมคิดร่วมทำผ่านกรณีศึกษา 4 แห่งซึ่งได้มีการร่วมคิดร่วมทำในการพัฒนา โดยวิเคราะห์เพื่อทำความเข้าใจกระบวนการและการปฏิบัติ

กรณีศึกษาทั้งสี่ ได้แก่ ชุมชนริมน้ำจันทบูร จังหวัดจันทบุรี ชุมชนบ้านเปร็ดใน จังหวัดตราด โครงการบ้านมั่นคงจังหวัดสมุทรปราการ และโครงการโรงพยาบาลชุมชนพรุใน จังหวัดพังงา กรณีศึกษาหลักที่จะวิเคราะห์อย่างละเอียดคือชุมชนบ้านหม้อ จังหวัดมหาสารคาม ซึ่งได้เข้าโครงการร่วมคิดร่วมทำในการพัฒนาระบบสาธารณูปการและการปรับปรุงบ้าน

ผลการศึกษาทั้งกรณีหลักคือชุมชนบ้านหม้อ และกรณีรอง 4 ชุมชน สะท้อนให้เห็นถึงกระบวนการและวิธีปฏิบัติในการร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างในประเทศไทย การวิเคราะห์ปัจจัยความสำเร็จที่สำคัญ ปัญหาและอุปสรรคในการดำเนินการ ทำให้ได้ข้อเสนอแนะเกี่ยวกับแนวทางกว้าง ๆ ในการร่วมคิดร่วมทำสภาพแวดล้อมสรรสร้างเพื่อการพัฒนาที่ยั่งยืนในอนาคต

สาขาวิชา	สิ่งแวดล้อม การพัฒนา และความยั่งยืน	ลายมือชื่อนิสิต .....
ปีการศึกษา	2562	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

5687762920 : MAJOR ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY
KEYWORD: co-creation, participatory design, co-design, built environment, sustainable development

Chainun Prompen : CO-CREATING BUILT ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT: A CASE STUDY OF BAN MOH, MAHASARAKHAM PROVINCE. Advisor: Narumon Arunotai, Ph.D.

Co-creation has been used widely in many fields, including innovation design, service design, and district development. In Thailand, many development projects apply co-creation as an approach to development. However, the academic knowledge about co-creating built environment in Thailand is limited and remains unclear. Therefore, this study aims to understand the processes and practices of co-creating built environment in the context of Thailand through the description and analysis of cases.

The four case studies described here include the Chantaboon riverfront community in Chantaburi Province, Ban Pred Nai community in Trat Province, Ban Mun Kong project in Samut Prakan Province, and Pru Nai community in Phang Nga Province. The major case which is described and analyzed in detail is the case of Ban Moh Community in Maha Sarakham Province where the community co-created public facility development and house renovation with researchers from outside the community.

The results of the study include the processes and practices of co-creating built environments in Thailand. It also identifies key success factors, problems and obstacles in the implementation of co-creation concept. Finally, this study suggests guidelines for co-creating built environment for sustainable development.

Field of Study:	Environment, Development and Sustainability	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....

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CHAPTER 1
INTRODUCTION

1.1 Rationale and statement of the problem

Even though paradigm shift in the planning policy from top down development to decentralized development or place-based development occurred since 1970s (Bφdker, Grφnbæk, & Kyng, 1995), the concept has recently been accepted in Thailand in 1990s. The constitution in 1997 is a legal structure that emphasizes public participation. However, the development projects still often neglect this matter or have the limitations in creating real participation.

There are several unsuccessful development projects that do not get cooperation from people and the community. The problems of development always occur because of the lack of participation in thinking and operating stages. These problems bring the development project to unsustainable development, because of the top-down policy without understanding the real needs of people who have to engage in the development. The misunderstanding in the problems of users and not getting cooperation always lead the development in the wrong direction that affects the wasting of budget and opportunities in the development. Besides, the development ideas that do not come from the users of the development project usually have not been accepted and cannot apply in the working processes and the implementation.

Moreover, disadvantaged people and local communities often experience non-inclusive development. They cannot reach a good quality of the built environment that

affects their quality of life, health, social, and economic well-being as well. Furthermore, the built environmental with top-down designs in several government projects do not match with the community context and the requirements of the users. These development projects are costly but are not pertinent to the real problems and needs of the users.

There are new concepts and experiments that bring architects, designers, or planners to work together with users in the development, particularly in the built environment development projects. Among these, there is a concept of co-creation that has been developed to create new solutions or innovations for the smarter built environment by engaging users, designers, and other stakeholders in the participatory design process. The co-creation concept, also called co-design, supports the end-users to take part in the design process with professional designers. Co-creation not only helps to create the solution or the innovation that precisely answers the real requirement of the users but also to raise the right of the users by engaging with the designer and other stakeholders in the whole process of co-creation.

Several cases of built environment design in Thailand use co-creation in the working process. Some cases use the exact term of co-creation, but some use the words like “participatory design”, “community-based design”, or “participatory action research”. The development of these various terms in the field of built environment should be studied in order to understand the processes and practices of co-creating built environment in the context of Thailand. This is done through the description and analysis of cases in this present research.

Co-creation has been applied in the built environmental design in different scales, including large-scale district planning, community development, housing development project, and public building. Therefore, it is essential to study several cases in order to compare the processes and practices among them. The cases in this study can be categorized into four groups as follows:

1) Large-scale district planning, such as co-creating Chum Saeng District (Nakhon Sawan Province) and co-creating Charoen Krung Street Area (Bangkok).

2) Community development project, such as the Chanthaboon riverside community (Chanthaburi Province) and Ban Pred Nai community (Trat Province).

3) Housing development projects, such as Baan Mun Kong (housing projects carried out by Community Organizations Development Institute or CODI (Public Organization); and Baan Eua Arthorn (housing projects carried out by National Housing Authority or NHA.

4) A group of buildings or individual building with co-created architectural design and/or development like community hospitals like Pru Nai Community Hospital (Phang Nga Province) and Benchalak Chaloem Phrakiat Hospital (Si Ka Ket Province).

This study focuses on exploring and analyzing the concepts, experimentations, and practices of co-creating built environment in the context of Thailand. This is done by exploring the sample cases of Chanthaboon riverside community in Chanthaburi Province, Ban Pred Nai fishing community in Trat Province, Baan Man Kong Project

at Ta Kok in Samut Prakan Province, and Pru Nai community hospital, on Koh Yao Yai in Phang Nga Province.

An in-depth study is done in Ban Moh, the traditional pottery community in Mahasarakham Province. Ban Moh project used co-creation approach in housing renovation and community infrastructure development. Ban Moh is an interesting case as it is a unique project that combined community development with housing renovation development including house design and construction.

The co-creation of Ban Moh community project was funded by the National Housing Authority (NHA) during the launch of an overall study of Thailand's rural housing development to find out suitable development for low-income rural villagers. The project was a pilot project to study about the North-eastern rural housing development plan in 2005-2006, led by the researchers from the Faculty of Architecture, Urban Design and Creative Arts, Mahasarakham University.

Ban Moh rural community development project focused upon and supported people's participation in order to create "self-reliance community" and to lead the village to the path for long-term sustainable development. The researchers collaborated with the members of the community to develop built environment in the community, including common infrastructure and housing renovation.

This project developed guidelines for community improvement through a participatory process with surveys and interviews of 144 households. After that, the community and the researchers agreed to improve selected 30 houses by self-relied design and construction process. The community and researchers set up the Housing

Development Fund (HDF) to operate this development project, including setting up rules and agreements together with HDF Committee. Later the "Evaluation Committee" was set to follow up the workflow. The researchers collaborated with the house owners to renovate these selected houses, and the HDF committee approved the budget to buy the materials for use in renovation. The house owners received building materials from HDF instead of money to prevent the misuse of money or corruption. The house owners agreed to pay back to HDF by installments, and the returned money would be circulated to develop the rest of the houses in the community. For this reason, every house in the community would be developed in different phasing in the long-term plan.

The development of Ban Moh community succeeded in the design and construction of community pottery center, in solving the problem of landlocked household, and in the co-creation, construction or renovation of selected houses.

However, the problem in the development project occurred after several house owners borrowed construction materials to renovate their houses but do not pay installments back to the HDF, and the committee could not collect the debt and could not continue to operate the next phase of the project. Finally, the researchers decided to terminate the project after helping the community to summarize and close the project account.

Ban Moh together with the sample cases represent the built environmental development in various scales and processes. The study will identify key success factors of the co-creation process, the problems and obstacles of co-creating built environment from these cases. The analysis finally leads to guidelines for the co-creation of community built environment development for sustainable development.

1.2 Objectives of the study

1. To understand the processes and practices of co-creating built environment in the context of Thailand through the description and analysis of cases.
2. To identify key success factors, problems and obstacles in the implementation of co-creation concept through a case study of Ban Moh Community
3. To propose guidelines for co-creating built environment for sustainable development

1.3 Scope of the study

This study focuses on the processes and practices of the co-creating built environment to understand co-creation and relevant concepts. It aims to identify processes, methods, techniques, problems, and obstacles from various case studies of co-creating built environment projects. This research covers all four scales of case studies including;

1. Large-scale district planning-- co-creating Chum Saeng project, co-creating Charoen Krung project.
2. Community development project—co-creating Chanthaboon riverside community and co-creating Ban Pred Nai community natural resource management.
3. Housing development project, co-creating Baan Mun Khong and Ban Eua Arthorn.

4. Architectural design project-- co-creating community hospital design and development of Pru Nai community hospital and Benchalak Chaloem Phrakiat hospital.
5. The open space development, a case study of Khlong Toei soccer field

This research explains the evolution of co-creation and the relevant concepts, including participatory design, co-design, and participatory action research in the practices and processes of these cases. These selected cases were developed between 2005 to 2016. They illustrated that co-creation concept in Thailand is evolving dynamically by the timing and the trend of the world.

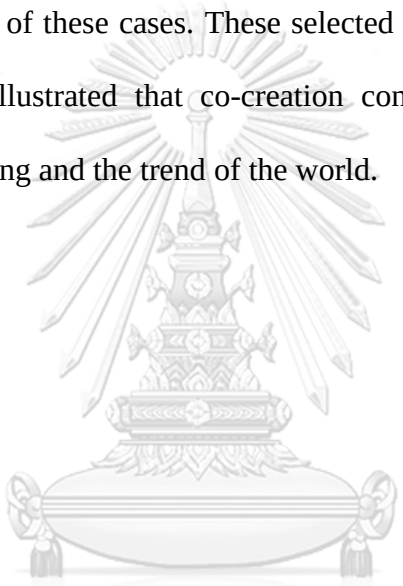

Table 1. Co-creating projects for analyzing in this study

Project	Type	Organizer/researcher	Area
Co-creating Chum Saeng	district planning	Community Architects Network	Chum Saeng District, Nakhon Sawan Province
Chanthaboon riverfront community	Community development	Arsom Silp Institute	Chanthaboon riverfront community, Chantaburi Province
Ban Pred Nai community	Community development	RECOFTC	Ban Pred Nai, Trat Province
Baan Mun Khong	Housing development project	Community Organizations Development Institute	Several projects nationwide
Ban Eua Arthorn	Housing development project	National Housing Authority	Several projects nationwide
Pru Nai community hospital	Architectural design	Researchers from Thammasat University	Pru Nai, Yao Yai island, Phang Nga Province
Khlong Toei soccer field	Open space development	Openspace Architects and TYIN Tegnestue Architects	Khlong Toei, Bangkok

The main case study is Ban Moh in Mahasarakham Province. Co-creating built environment in Ban Moh case is the combination of community development and housing renovation with co-design and construction. The data were collected and analyzed with secondary data study and field study by survey, observation, in-depth interviews with the key stakeholders, and also assessing the usage of built environment in the site as well.

1.4 Expected Outcomes

1. Reviews of concept of co-creating built environment in the context of Thailand.
2. Knowledge about processes and methods for co-creation of built environment from the case studies.
3. Guidelines of co-creating built environment for sustainability.

1.5 Significance of the Study

Nowadays, there are practices in the co-creation of built environment in many areas in Thailand. These projects used different words, with a variety of concepts, processes, groups involved, methods of participation, etc. Meanwhile there has not been much academic work that analyzes this matter. This research provides a deeper understanding of co-creation and participation. The analysis of obstacles will lead to the guidelines that will allow co-creation to expand and take into account the issues for sustainability.

CHAPTER 2
LITERATURE REVIEW

Chapter two is a review of knowledge on co-creation and focuses on the relation between design evolution and co-creation for the built environment development. It gives an overview of the evolution over time of co-creation to provide the basis for further understanding. Relevant researches on various aspects of community development related to co-creation and sustainable design are reviewed, including different methods, techniques, and criteria for applying co-creation in communities. The chapter also reviews public participation in selected built environment development projects that applied co-creation concept and processes.

2.1 Co-creation

The term “co-creation” was initially used as a strategy frame for improving the value by the co-creation of value between the producer and the customer of the business (Kambil & Friesen, 1999; Kambil, Ginsberg, & Bloch, 1996). Besides, Prahalad and Ramaswamy (2000) stated the customer roles had evolved from the passive audience to the active player by the co-creation of value. Ramaswamy and Ozcan (2018, p. 196) defined co-creation as, “enactment of interactional creation across interactive system-environments (afforded by interactive platforms) , entailing, agencing engagements and structuring organizations”.

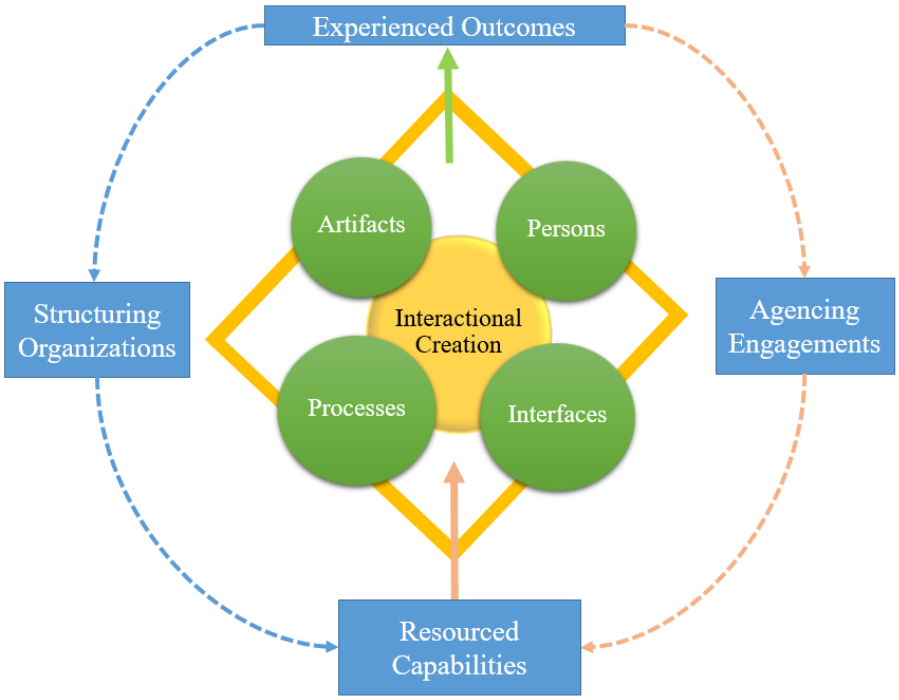

Figure 1. Conceptualization of co-creation

Source: Ramaswamy & Ozcan (2018)

2.1.1 The evolution of co-creation

The development of co-creation started in the 1960s in Scandinavia where the trade unions raised the right of the workers to cooperate in workplace design, there were many experiments for improving higher productivity and increasing job satisfaction. Since 1973, the delegated workers in Sweden had the right to represent the board of directors of the company. Sweden declared an Act on board representation for private sector employees in 1987 (from original legislation in 1973) (European Foundation for the Improvement of Living and Working Conditions, 1998).

Co-creation had emerged again in the 2000s by Prahalad and Ramaswamy (2000, 2004) in the business and marketing field to empowered the customer voices to change the market and products. The co-creation between the customers and the enterprises expanded to open innovation, collaborative innovation, and customer-led innovation. Ramaswamy and Gouillart (2010) released the book “The Power of Co-Creation: Build It with Them to Boost Growth, Productivity, and Profits” and described the benefits of co-creation in the business of the successful companies like Apple, Microsoft, Unilever and Nike that had used co-creation with the customers in the product development and design process.

2.1.1.1 Cooperative Design

Since 1970s in Sweden, Cooperative Design was firstly applied in computer software design for use in the workplace. The users of this computer software, including the workers, were allowed to take part in the design process for developing the suitability software (Bφdker et al., 1995). The cooperative design movement had been used widely in the Scandinavia in the 1970s-1980s to encourage democracy and workers' participation. Besides, the action research concept was used for active co-operation with the researchers and the workers for the better work environment in the pilot project by Kristen Nygaard and the Norwegian Metal Workers' Union, and in the projects called DEMOS and UTOPIA (Ehn, 1993).

2.1.1.2 Participatory Design

Velden and Mörtberg (2014) defined Participatory Design as a collection of design practices to involve the user of the project in the design process. This approach was developed in Scandinavia in the early 1970s. It was influenced by and matured simultaneously with a range of projects that focus on the democratization of work life. However, the weaknesses of the participatory design are

- Ignored users' experience
- Mainly concentrated on the function of things
- Used factory and machine to produce almost everything
- Designers did not have the feedback from the users

The Scandinavian democracy movement and "Participatory Design" has been developed and later adopted in the USA in the 1970s. Participatory Design has been used in urban design collaborative place-making and collaborative planning in the 1980s. Participatory Design has gradually been popularized and the Participatory Design Conference (PDC) has been held bi-annual since 1990 for exchanging and improving the participatory design knowledge.

2.1.1.3 Service Design (SD)

Shostack (1982) is the initiator of the Service Design idea. She suggested the service design instead of design in the product only. Service design put the emphasis on improving the experiences of the users of the services. Better service design makes the user more satisfied, therefore, it can bring market success and growth.

Kimbell (2015)described this idea in the Service Innovation Handbook that focuses on service organizations. These organizations create value by bringing people and resources together in different ways. Service design does not focus only on the users' needs but also on everyone's needs that related to the design and production ideas.

Birgit Mager defined service design as the use of thinking methods and practices in the design process to help develop a service model. Such a design of services will create more benefits and promote users' satisfaction and impression in services. It is essential to be able to create tangible and abstract results for the organization (Thailand Creative & Design Center, 2014).

Figure 2. The processes of service design
Source: Thailand Creative & Design Center (2014)

The processes of service design start from exploring the real needs, then co-creating design, creating the testing prototype system to develop service design, and bringing to implementation in the real business.

2.1.1.4 User-Centered Design

Don Norman (1988) defined "User-Centered Design" as a concept that aims to change the design mindset from task requirements to thinking about human needs in holistic system, therefore, it is the design based on the needs and interests of the users (decrease the role of usability). User-centered design is not only treating users as the tester of the design but focusing on the user experience and the satisfaction of users.

PARTICIPATORY DESIGN		USER-CENTERED DESIGN
User testing	VS	User experience
Efficiency		Needs
End-user development		User at center of development

Figure 3. Different between participatory design and user-centered design
Source: Norman (1988)

2.1.1.5 Human-Centered Design (HCD)

Human-Centered Design is the design method and a tool to create innovative solutions to problems by looking deeper into the base of the problem and focusing on understanding the needs of most people. Human-centered design, from a social project or social perspective, is about the belief that it will make a difference and that there are new processes in order to get relevant new solutions that have a positive impact. The user-oriented design helps to expand the users involved by opening up for more human engagement that are not limited to only the users.

Norman (2013) built further on the user-centered design concept into the human-centered design in his book "The Design of Everyday Things". In 1999 the basis of the user-centered approach was assigned in the International Standard Organization specified the fundamental principles in version ISO 1999 now included in the updated version ISO 9241-11:2018. This standard is called "Human Centered Design processes for interactive systems" as it considers not only the "users" but also all human actors or stakeholders in the systems. The principles of UCD to the design process are as follow:

- The design depends on a clear understanding of users, tasks, and environments.
- All users are engaged throughout design and development processes.
- The design is driven and refined by user-centered evaluation.
- The process is tested and develop many times.
- The design focuses on the whole users' experiences.

- The design is integrated by multidisciplinary skills and perspectives.

The HCD concept emphasizes on

- Understanding people's needs
- Solution finding methods
- Sustainability of the solution

HCD is a process that starts with the needs of people then ends with new solutions that are designed to suit their needs. Human-centered design is all about building a deep understanding of the affected people, then gathering a large number of ideas, building prototypes, sharing them with the target users, and finally applying the tested prototype to implement the innovation in the real world.

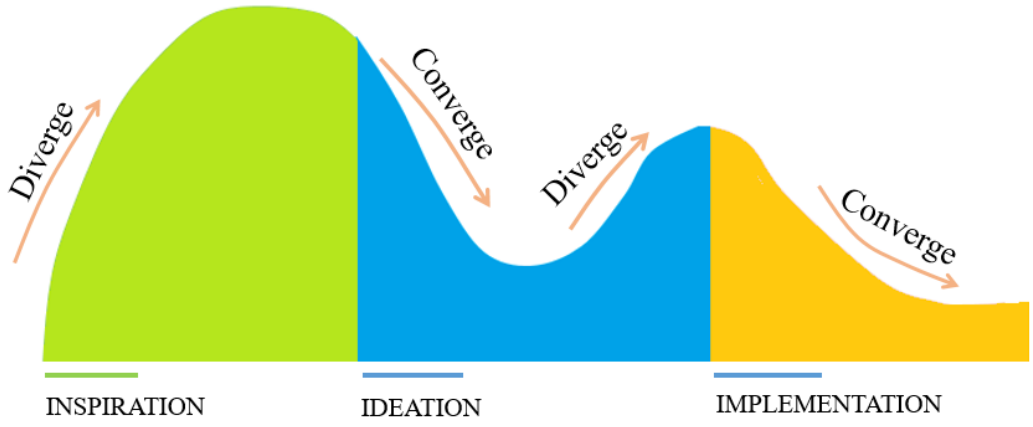

Figure 4. Phases of Human- Centered Design
Source: ideo.org

Human-Centered Design consists of three processes (ideo.org).

1. Inspiration process. The designer studies the lifestyles and behaviors of the users to deeply understand the real need of the users.
2. Ideation process. The designer identifies opportunities and possible solutions to design the prototype(s).
3. Implementation process. The designer applies a solution or design innovation to the users' life and tests whether the solution meets the needs or not.

Human-Centered Design is both a method and a mindset that started during the 1990s-2000s concentrating on social system and empathy. More detail is shown in figure below.

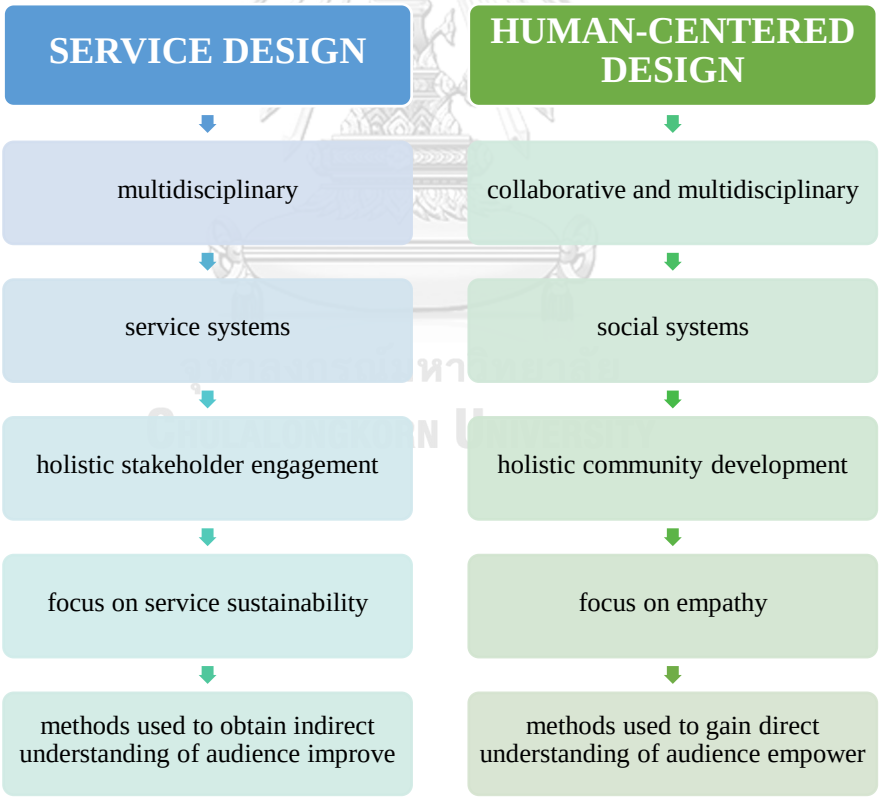

Figure 5. Differences between service design and human-centered design

Source: Norman (2013)

Kim, Myers, and Allen (2017) described the creative human-centered problem-solving approach that starts from collecting generative ideas from stakeholders and bringing them in to create prototype. After that, the prototype is brought in to test with the real users to find out the problem of usage. Then the prototype will be modified before bringing the product or design innovation to implement in the final process.

This human-centered design activities cycle starts with the planning process that gathers the users and stakeholders to brainstorm in understanding and specifying the context; then determining the use and the organizational requirements to find out the real problems to solve by design.

After understanding the requirements, the professional designer has to bring these problems and requirements to develop design solutions. These design solutions are then provided to the users and all stakeholders to evaluate designs against requirements. If the design meets the requirements and all stakeholders agree to accept the design solution, the design will be developed to the final design with the additional design details for completion (Navalkar, 2012).

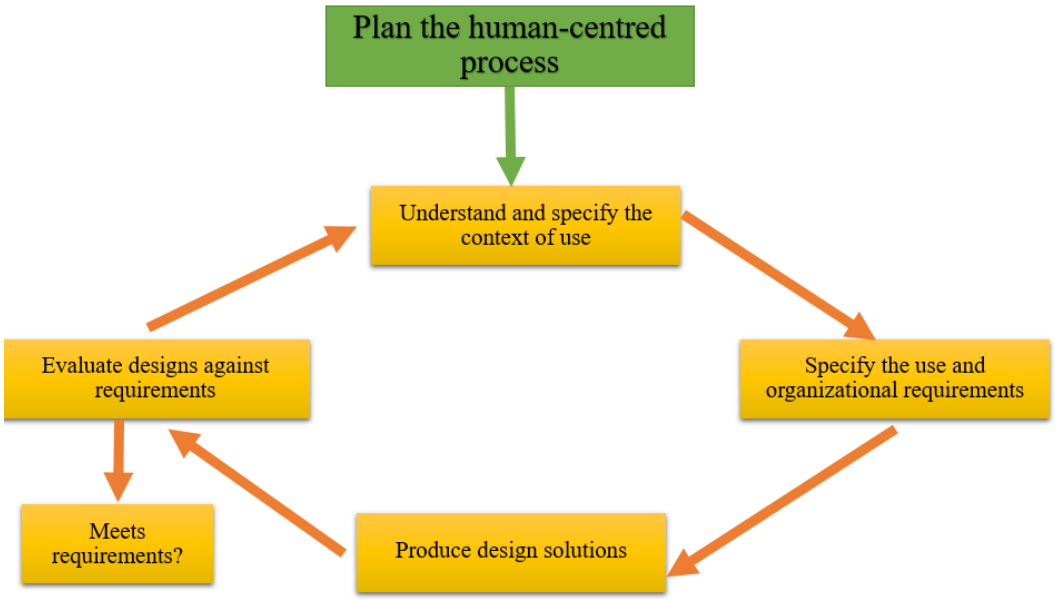

Figure 6. Human-centered design activities cycle

Source: Navalkar (2012)

IDEO, a global design company, defined the step of a human-centered design cycle that starts by understanding the context of the problems by observation and collection of the issues from a different point of view of various users and stakeholders. After that, the designer and all stakeholders would listen and brainstorm in order to ideate the possible solutions. If the ideas have been agreed upon, the professional designers would bring the ideas to design the prototype for testing before implementation.

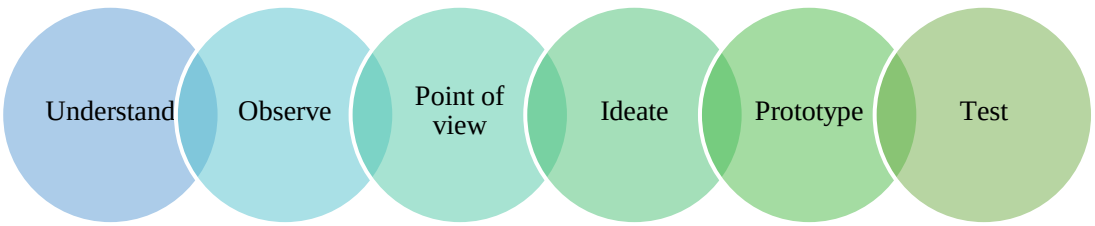

Figure 7. The step of human-centered design cycle

Source: IDEO.org (2018)

2.1.1.6 Design Thinking

The first symposium on Research in Design Thinking held at Delft University, The Netherlands, in 1991. Since the first symposium, researches in design thinking has been applied and developed. Cross, Dorst, and Roozenburg (1992) explored the state of knowledge in the field of design thinking (then) and explained design thinking in three main areas of 1) problem formulation, 2) solution generation, and 3) cognitive strategy. Later, design thinking has been popularized in several fields, and problem formulation and solution generation became even more innovative through real use.

Design Thinking can be defined as the process of creating products or services that solve the problem by design. This design thinking process is popularized by Stanford University d. school and is applied to use in different fields included the strategic improvement of top-ranked companies such as Google, Apple, Airbnb, etc.

The steps of design thinking consists of 5 steps as follow: (https://dschool.stanford.edu)

1. Empathize: to observe the problem from the view of different users
2. Define: to collaborate define the important and state of the problem
3. Ideate: to brainstorm to collect every idea from everyone
4. Prototype: to design the prototype from the different idea
5. Test: to test the prototype if it works or need to develop the better idea again

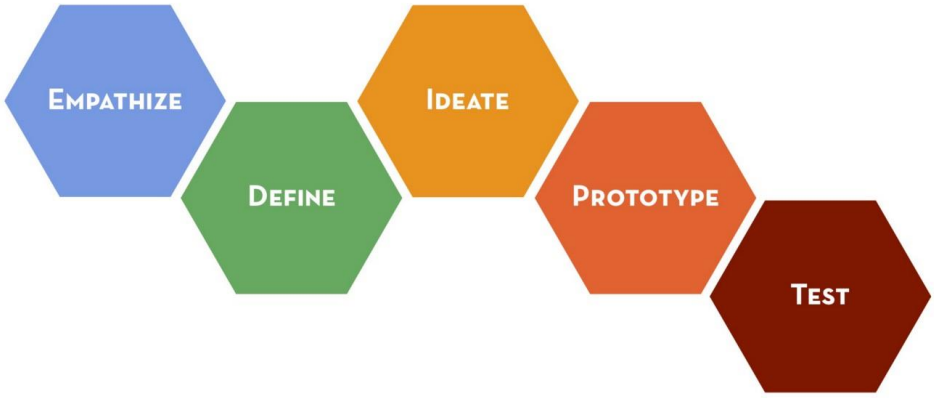

Figure 8. The steps of design thinking
Source: https://medium.com/@elizabeth7hoffman/

Brown & Wyatt (2010) explained design thinking in "Design Thinking for Social Innovation" that it goes beyond designing products for the consumers, because in the process, consumers' experiences are also focused. The user's experience (UX) design becomes well-known in various fields of design, particularly in the web design and the interface of mobile and computer applications.

The three spaces to consider in design thinking include inspiration, ideation, and implementation. Inspiration starts from the problem or the need to find out a better solution. Ideation is the process of generating, developing, and testing ideas. After the test and improvement, the design will be implemented and provided for the real usage.

Kim et al. (2017) used design thinking to improve patient experiences in healthcare settings. This human-centered problem-solving approach is different from traditional

approaches to problem-solving. The design thinkers make great efforts to understand patients and their experiences before coming up with solutions.

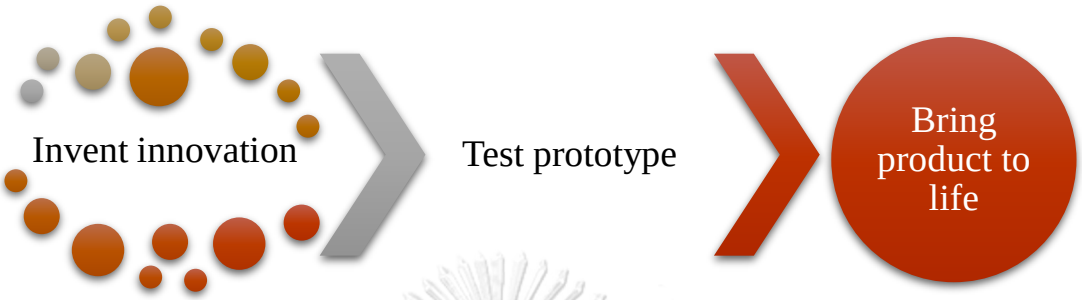

Figure 9. The processes of design thinking
Source: Kim, Myers, & Allen (2017)

Brown & Wyatt (2010) explained the importance of design thinking which includes:

- Design thinking represents optimism, creativity, and experience.
- Design thinking meets the needs of people who will use products or services so it is an enabling infrastructure.
- Businesses accept design thinking because it promotes innovation, and therefore businesses can better differentiate their brands, thus bringing products and services to the market faster than before.
- Non-profit organizations begin to use design thinking to develop better social solutions as well.

Design thinking crosses the ordinary boundary between government, private and non-profit sectors. By working closely with customers and consumers, such a design brings high-impact solution created from the bottom rather than dictated from the top.

2.1.1.7 Co-design and co-creation

Co-design is the main idea of co-creation that includes the users into the design process together with the designer. Sanders & Stappers (2008) described the shifted paradigm in design research from a user-centered approach to a co-design approach. The roles of the designer, the researcher, and the users of the design has been changed to the new roles. The changing of roles affects the practice of the designers and the researchers dramatically. The paradigm shift of design research from an approach of user-oriented to co-design approach changes the design practice pattern of the designers by creating new directions of overall creativity. They predicted this progress would support the transition to a more sustainable way of life in the future. In the classical user-oriented approach, the user requirement is the subject matter that the researcher has to find out and reports to the designer to design. While the co-design approach is changing the practice method to involve all stakeholders in a process, it takes a shorter time and creates more satisfaction for everyone.

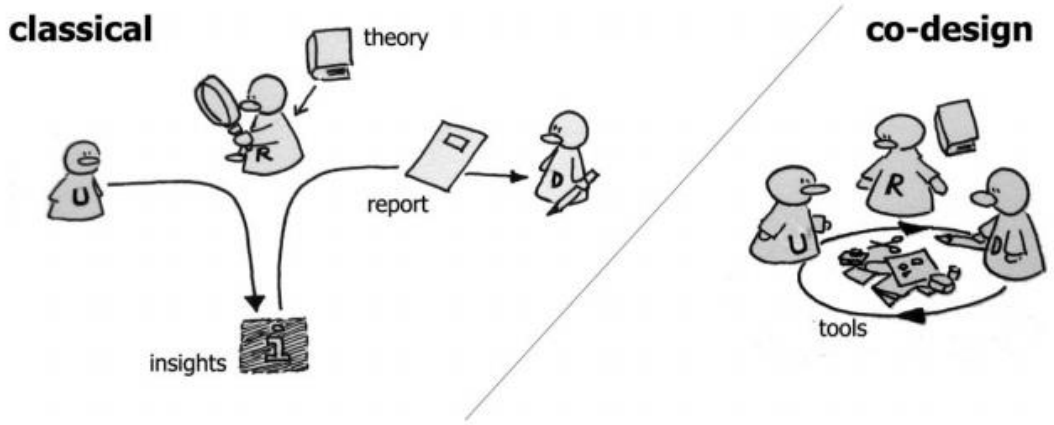

Figure 10. Classical roles of users, researchers, and designers in the design process and the co-designing process
Source: Sanders & Stappers (2008)

Co-creation is the process that new solutions are designed with people, not for them (Sanders & Stappers, 2008); this concept based on an idea of cooperative inquiry by Heron (1971). Co-creation is strongly connected to the notions of " participatory design", "co-design", "design attitude" and "design thinking" that have been emphasized in recent years as absolutely central to innovation (Boland., Collopy, Lyytinen, & Yoo, 2008). Co-creation can bring a different creative process, diverse participation of people, and multi-disciplinary knowledge to the people inside and outside the organization throughout the process.

Co-creation is the key to recognize that everyone can be creative; they can be actors, social innovators, and, not the least, end-users like communities, families, and individual citizens and businesses. The co-creation concept was widely used in the

various fields to engage the broad stakeholders in the design process and the problem-solving process as co-designer (Gioia, 2015).

The benefits of co-creation are divergence and execution (Bason, 2018). Divergence means to gather various ideas and opinions from a variety of participant groups by opening up the design process to the public. The public sector can choose from alternate ideas before developing the prototype and decision-making. Multi-disciplinary knowledge can join in to suggest conceptual design and schematic design. Execution means the selected co-creation idea can strengthen the implementation. Co-creation brings a cost-effective solution because it eliminates the clumsiness and disappointment of the implementation and take a shorter time in the operation process (Hartley, 2005; Scharmer, 2006).

2.1.1.8 Summary of the terms and definitions

Table 1. Summary of the terms and definitions

Term	Definition	Used by
Cooperative Design	Involve the users in the design process	Bφdker et al. (1995) Scandinavia in the early 1970s
Participatory Design	A collection of design practices to involve the user of the project in the design process	Heron (1971); Velden and Mörtberg (2014)
Service Design	Not focus only users need, but include the idea from all stakeholders	Shostack (1982) Kimbell (2015)
User-Centered Design	Design based on the needs and interests (decreases the focus on usability)	Norman (1988)
Human-Centered Design	Expand the scope of user than UCD. Use as the tool to create innovative solutions to problems	IDEO (1991), Norman (2013)
Design Thinking	Related to HCD but divided into 5 steps	d.school Stanford U. IDEO (1991)
Co-creation	Engage the users and public in the development projects and innovations	Prahalad and Ramaswamy (2004)
Co-design	Include the users and other stakeholders to design together with the designer	Sanders & Stappers (2008)

2.1.2 Types of Co-creation

Koning et al. (2016) explained five types of co-creation in the matrix by level of collaboration, direct value created, and phase in the design/innovation/use process. Co-design takes the shortest phase in the design process with the highest level of collaboration, followed by the community-design while the community-design creates the highest direct value because it impacts the community that creates value in many dimensions.

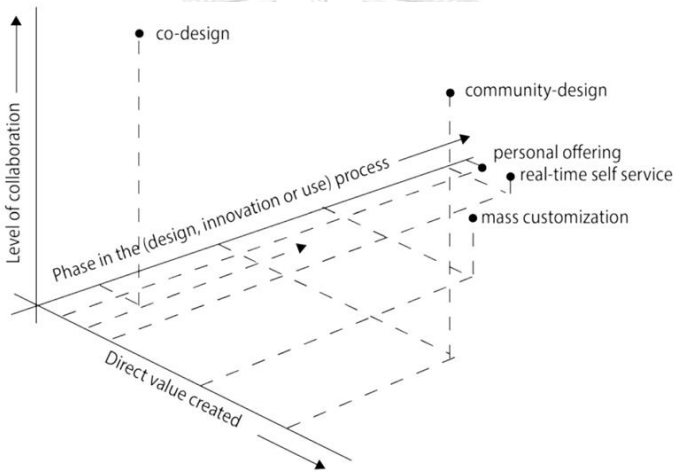

Figure 11. Five types of co-creation
Source: Koning, Crul, & Wever (2016)

2.1.3 Steps of co-creation

The design stage of Co-creation process can be separated into five steps including (Koning *et al.*, 2016)

1. Invite the users and stakeholders to join the workshop

2. The users and stakeholders share their problems, requirement, ideas, and suggestions to one another
3. The workshop moderator combines and categorizes the problems, requirement, ideas, and suggestions
4. The designer and stakeholders select and find out the impacted problems and ideas
5. Continue to design the prototype or innovation from the collected problems and the requirements

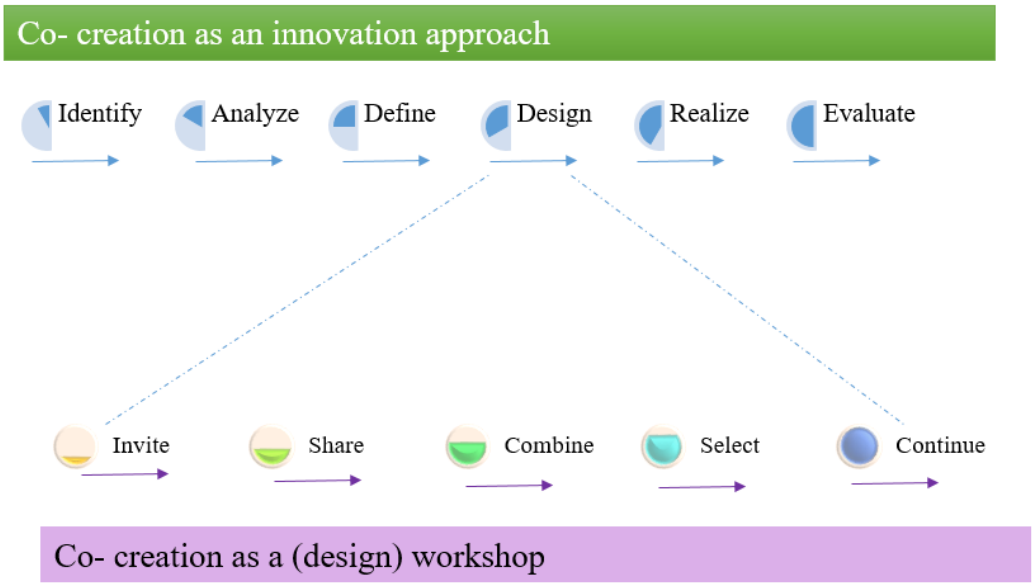

Figure 12. Steps of co-creation

Source: Koning, Crul, & Wever (2016)

2.1.4 Spectrum of Co-creation

Ilbine, Charlotte, Crul, & Wever (2016) described the spectrum of co-creation that co-creation can become a more innovative approach when compared to traditional business approach, yet when co-creation is a design method, the level of collaboration and influence on the output are even higher.

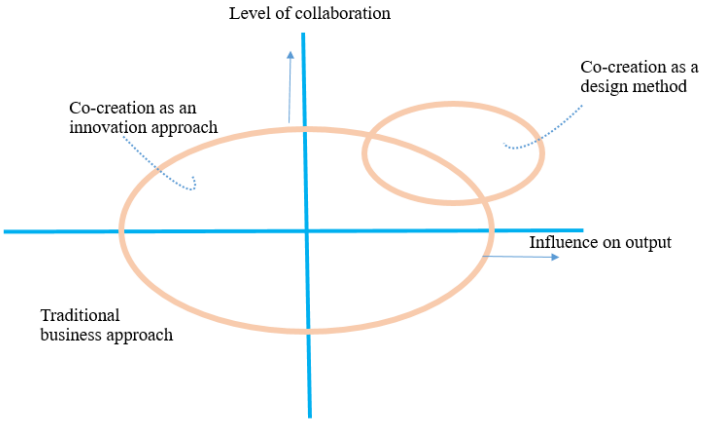

Figure 13. The spectrum of Co-creation.
Source: Koning, Crul, & Wever (2016)

2.1.5 Co-creation and Sustainable Development Goals

The United Nations Rio+ 20 summit (United Nations, 2 0 1 2) has agreed that participated countries have to commit a set of sustainable development goals (SDGs). Adams (2017) stated the four sustainable development goals that directly links with co-creation including;

- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries (inclusive development)
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Figure 14. Co-creation directly links to Sustainable Development Goals: SDGs
Source: Adams (2017)

2.1.6 Co-creation stakeholders

Stakeholders in the co-creation project come from three categories. The most important stakeholder group is the real user that includes the main user (owner and community) and sub-user (traveler and nearby community). The cooperation of people in the community is the key power to drive the co-creation project to the goal.

The second stakeholder group is the professionals, including professional designers and researchers. This group acts as the moderator and leads the co-creation to the goal with multidisciplinary processes. The supporter is also essential to fulfill and support the requirements that help the co-creation project in different ways.

Table 2. Co-creation stakeholders

Source: Adapted from LSE Innovation Co-Creation Lab http://www.icclablse.com/

Real user	Professional	Supporter
• People (owner) • Community • Traveler • Nearby community	• Architect • Engineer • Designer • Private design firm • Professional organization • Researcher • Academic institute • Specialist • Government agency	• Social entrepreneurs • NGOs • Social investor • Company • Financial institute • Government

2.1.7 Key component on co-creation and incentive development

The participatory design process, especially co-creation, has received more attention nowadays in the design field (Steen, Manschot, & Koning, 2011). There is a stakeholder participatory involvement in co-design process, which starts from linking to the same goals and transformative aims (Sanders & Stappers, 2008). However, there

are several concerns in design literature about the readiness of co-design to realize transformation (Vink, Wetter-Edman, Edvardsson, & Tronvoll, 2016).

2.1.8 How co-creation influences well-being

Understanding and enhancing well-being through services is the overall purpose of Transformative Service Research (TSR). The emerging area of TSR highlights several essential dimensions of well-being to be considered when exploring the impact of service on well-being (Anderson & Ostrom, 2015). These dimensions include:

- Well-being level
- Impact on actors and various legal entities (Including individuals, families, consumer agencies, community service agencies, etc.)
- The well-being of Eudaimonic (human prosperity and awareness of potential) and happiness well-being
- Positive results (high-value creation) and negative results (value destruction)
- Intended and unintended consequences of well-being

2.1.9 Co-creation in actual projects

Various projects used co-creation concept and processes. These projects are not limited to community planning, built environment and product design, but extending to natural resource management and healthcare services development. Some of the examples of co-creation in actual project and implementation are as follow:

Co-creation of the architecture of a Buddhist temple -- Techa-amnuaywit (2013) started from finding the user requirements on real site architecture design of Wat Pa Vimuttayalai (Vimuttayalai Forest Temple) in Pathum Thani Province. This was done throughan action research procedure that has the researcher as one of the variables. The study applied Sappaya 7, the dharma of the seven external factors affecting mind improvement, in the process of designing the temple. The main participant in this project included the venerable V. Vajiramedhi, a highly respected monk, or in other words, “project user”.

Co-creation of natural resource management: Ssozi-Mugarura, Blake, & Rivett (2016) studied on supporting community needs for rural water management in Uganda to manage their water supplies by using information and communication technologies (ICTs). This was developed with the community-based co-design method. This participatory and inclusive approach introduced technology to the three communities that are untrained and inexperienced in technology design. Their design experience with the communities highlighted both the barriers and enablers of using the community-based co-design (CBCD) method with rural users. The authors concluded

with the reflections on using intermediaries and on the issue of reciprocity in community-based ICT for development research.

Co-creation of the design for medical equipment: Bird (2016) studied on an engagement process in the co-design of mammography machines. This study explored and analyzed the co-design of medical equipment by using the voice of the users. Data were collected through in-depth interviews with the members and through recording video footage of co-design meetings. The author found that developers and users had to re-negotiate their roles during the co-design process, particularly to brainstorm in the development and to find out ideas and solutions. The co-creation process took time to develop, but it had an impact on the dynamics of the users' co-design group and led to the development stages.

Co-creation of healthcare service development: Elg, Verma, Engström, Witell, & Poksinska (2012) used an action research approach to develop patient co-creation of knowledge of healthcare service. They suggested a model through three learning methods. First, the model may be used as a means for generating and collecting patient ideas;

Second, a single patient's story can be illustrated and can serve as an incentive

for healthcare service development and the creation of the patient-centered care; Third, a larger number of diaries can be analyzed and combined with patient surveys to provide a deeper understanding of patient experiences in healthcare services. So, the exchange of ideas, storytelling, and diary publishing in the network are the essential methods in the co-creation.

Co-creation of sustainable cities through technologies: Gutierrez, Amaxilatis, Mylonas, and Munoz (2018) studied on empowering citizens toward the co-creation of sustainable cities. They suggested innovating new services and technologies for urban ecosystems. The city administrators, urban infrastructures, and other stakeholders are involving in the intensive use of advanced technologies for improving the capacity and sustainability of the city. Advanced technologies generate a large amount of useful information for applying to city development. Therefore, they created the user-friendly tools for urban stakeholders to use in city management. These tools enabled to provide an opportunity for exploiting the concept of a connected city. This support to create the innovation in all city dimensions, and develop with the co-creation concept to implementation, including impact on government policies.

2.2 Public participation

2.2.1 Background and definition of public participation

Bhatnagar and Williams (1992) described participation as a function of information that people can participate in and share their development view, make their options, and operate the development activities.

The World Bank (1994) gave the meaning of participatory development as the process that the stakeholders can influence or control over the decisions about the development that affect their lives.

Lister (1998) argued that the right to participation in decision-making should be

included in the nexus of the human right and the decision-making in social, economic, cultural, and political matters.

The Scottish Parliament (2004) also defined participation as the two-way relationship between the state and people that includes educational process that fulfills citizenship.

Creighton (2005) defined public participation as a process that incorporates public concerns, needs, and values into the decision-making process. It needs two-way communication and interaction of government and participants to find out the better decision supported by the public. Participation process brings people to get involved in the development that affects their life. Moreover, to support participation, government systems and organizational structures are needed.

Morris (2006) defined participation as sharing the responsibility for solving problems. It is not only to consult with the communities, but to involve them in the decision-making process for sharing responsibility in development.

Albert & Passmore (2008) described participation as all activities from all members that shape the result of the decision-making made by a public organization.

The International Association for Public Participation [IAP2](2007a) and Co-intelligence Institute (2008) described that public participation is involving all the people, which were affected by the decision making, in the decision-making process. The Co-Intelligence Institute (2008) stated in the core values of public participation that the public's contribution should include the promise that the public's contribution will influence in the decision, and the decision-makers have to design an appropriate participation method for collecting the opinions from all participants.

Regarding the linkage between participation and sustainable development, sustainable development concept involves equity and justice through people’s empowerment.

According to The Rio Declaration released from the United Nations Conference on Environment and Development, Principle 10 states that the way to solve environmental issues needs public participation.

At the national level – Public authorities shall provide concerned information to people particularly the information about hazardous projects

At the community level – State shall provide information and encourage public awareness, and give a chance to people to participate in decision-making process of development projects, including redress and remedy.

Also, it was mentioned in the other Principles about the vital role of women (Principle 20), youth (Principle 21), indigenous communities, and local communities (Principle 23) in environmental management and development. These group's full participation is necessary to reach sustainable development goals.

Moreover, Agenda21(United Nations, 1992a)mentioned in paragraph 23.2 that the broad public participation in the decision making is the prerequisite for sustainable development, and in paragraph 26.3 stated about establishing a process to empower the local people and communities to protect their land, culture and natural resources.

These international agreements emphasize the necessity of public participation. Agenda 21 also declared that the public participation should be considered in the development planning and policies at local, regional and national levels.

According to many international agreement documents that refer to the term "Public Participation", many definitions of public participation were given by different sources. The Rio Declaration on Environment and Development(United Nations,

1992b), Principle 10, stated that the best way to handle environmental issues is the participation of all concerned citizens.

2.2.2 Levels of public participation

Arnstein (1969) suggested eight steps in the ladder of participation, from low level of participation to high level. These eight steps of participation can be categorized into three levels --Non-participation, Tokenism, and Citizen Power.

A. Non-participation level

This level has two rungs that represent two types of non-participation. The goal of this level is only to maintain the relations with the affected people without their participation in real planning. This level includes

1) Manipulation: this step was not genuine participation. People played a role as rubber-stamp in the participation process

2) Therapy: the power-holders cured the affected people by engaging them in the activities that change their opinions into the way that the power-holders want.

B. Tokenism

This level uses the participation process as a symbolic gesture, but the participants cannot be ensured that their opinions will be used in the decision-making process. This level includes

1) Informing: people are informed of what will happen, but the people's voice or ideas will not be counted in planning and decision making. **2) Consultation:** the opinions of the affected people may be heard. However, this cannot guarantee that their voice will be applied in the decision-making process.

3) Placation: the people can be selected to work on the decision-making board, but with the proportion of the board members, the representative people cannot outvote in the decision. So, this is why Arnstein arranged this rung in the Tokenism level.

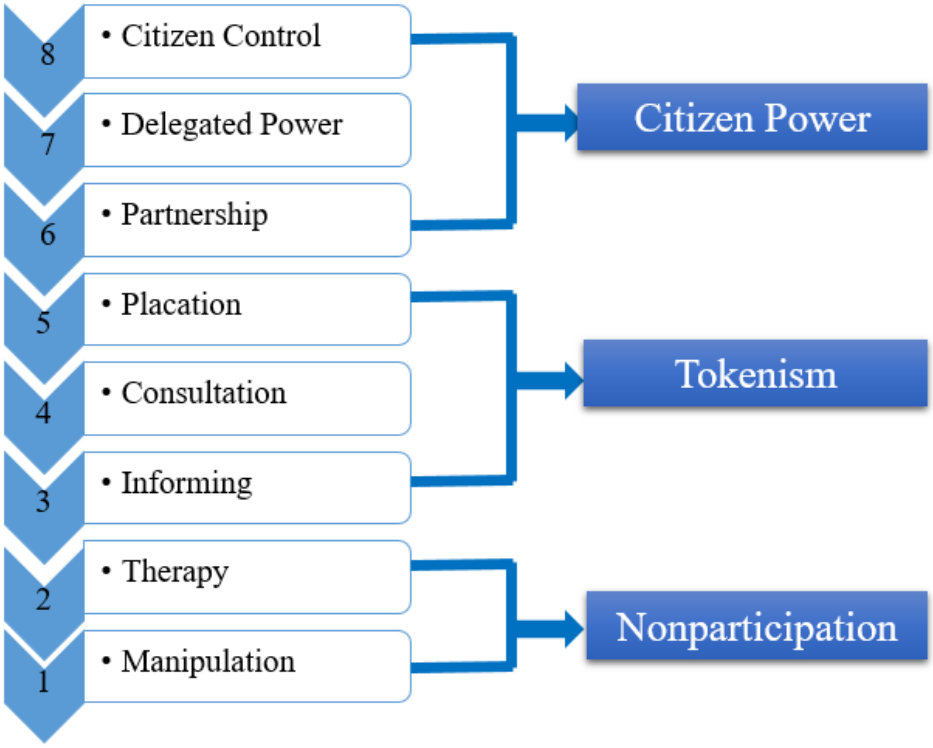

Figure 15. A Ladder of Citizen Participation
Source: Arnstein (1969)

C. Citizen Power

This level represents the power of the participants in the decision-making process starting from negotiating to the decision. This level includes

1) Partnership: the power-holders and citizen work as a partner, and the citizen's opinions will be brought to the decision-making process.

2) Delegated power: the power-holders have to negotiate with the delegates from the affected people. These delegates have enough power to deal with the board that works together between the power-holders and the delegates.

3) Citizen control: this rung is the top of the participation ladder, so people have the real power to decide with the power-holders.

Bass et al. (1995) categorized the typology of participation in the policy-making into six types including;

1) Participants listening only (e.g. the participants just receiving information from project owners).

2) Participants listening and giving information (e.g. through public inquiries, surveys, other medias).

3) Participants being consulted (e.g. through working groups and meetings held to discussion).

4) Participation in analysis and agenda-setting (e.g. through multi-stakeholder groups, round tables, and commissions).

5) Participation in reaching consensus on the main strategy elements (e.g. through national round tables, parliamentary/select committees, and conflict mediation).

6) Participants involved in decision-making through involvement in the policy, strategy, or components.

Creighton (2005) stated that public participation uses two-way communication and interaction. He suggested that public participation aims to find out the consensus for

better decisions that agreed upon by the public. He also argued why the public did not have the right to make a decision, but the state administrator always considers to choose.

Creighton suggested the continuum of participation in four levels, including **1) Inform the public**: the power-holders provide necessary information to the public. This is the one-way communication, and the public cannot give their opinions or any suggestions in the development project.

2) Listen to the public: the power-holders listen to the opinions and suggestions from the public and stakeholders and bring it into the decision-making process.

3) Engage in problem-solving: the stakeholders engage in the process to find out the solution for solving the problems together with the power-holders.

4) Develop agreements: in this level, the power-holders and all of the stakeholders or their delegates will work in collaborate in the decision-making process to develop the agreements for the implementation.

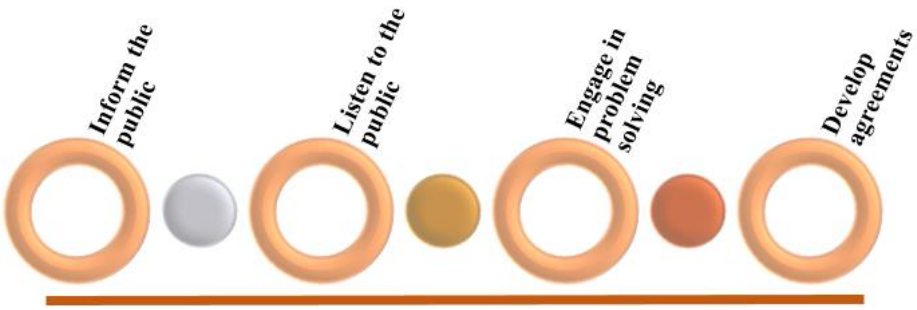

Figure 16. Continuum of participation
Source: Creighton (2005)

The International Association for Public Participation (2007b) explained "Spectrum of Public Participation" as follows:

1. Inform – providing necessary information to the public.
2. Consult – making the discussion or suggest to the public, collect the opinions and suggestions from the public.
3. Involve – working with the public to ensure public concerned and hope.
4. Collaborate – working together with the public in each topic.
5. Empower – the public has the right to make the decisions.

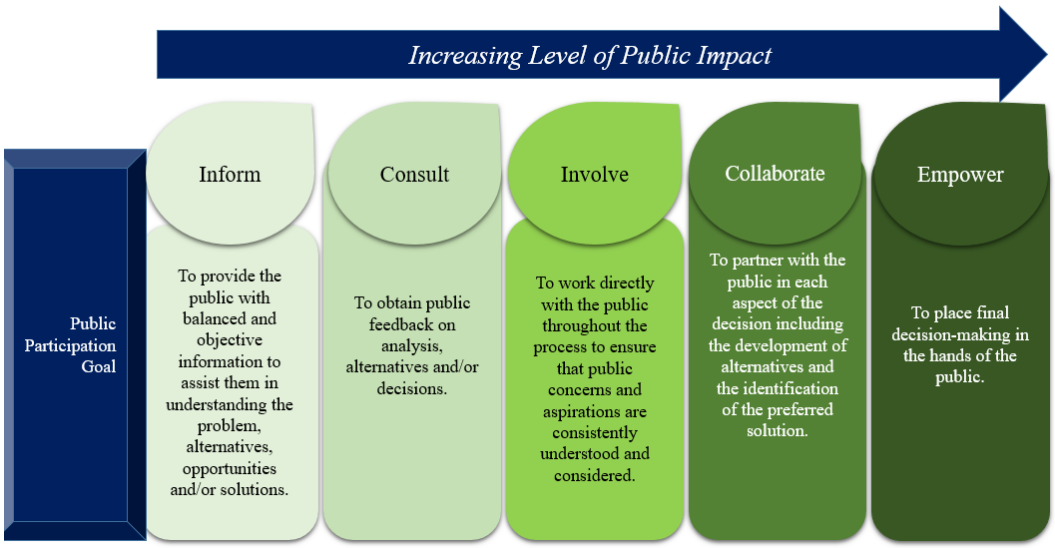

Figure 17. Spectrum of public participation
Source: IAP2 (2007) from http://www.iap2.org

1) Luyet, V. et al. (2012) developed five degrees of participation included:

1) **Information:** to provide the appropriate information about the development project to the stakeholders.

2) **Consultation:** not only to provide information but also to collect opinions and suggestions from the participants. But this suggestion might not be used in the decision-making because this will be decided by the power-holders.

3) **Collaboration:** to provide information and to collect opinions and suggestions from the participants. The suggestions from stakeholders will take into account in the decision-making.
4) **Co-decision:** to work together with stakeholders from start to the decision-making processes.
5) **Empowerment:** the stakeholders will send their delegates that have the power to decide in the development project.

2.2.3 Public participation in the development processes

Bass et al. (1995) stated that public participation could be applied to all process of strategy cycle starting from the initiation of the development that

1) public participation can help in identifying the problems and assembling information from participants to have the clear picture,
2) set the objectives and formulate the policy and priority,
3) design the action plan and budgets,
4) participants take part in in the implementation process,
5) participate in monitoring and assessment process, and
6) feedback the suggestions and opinions as information for developing the next planning process.

Cornwall (2008) argued that in the real implementation, one needs to choose which stages to allow participation, and which stakeholders should participate and why select them.

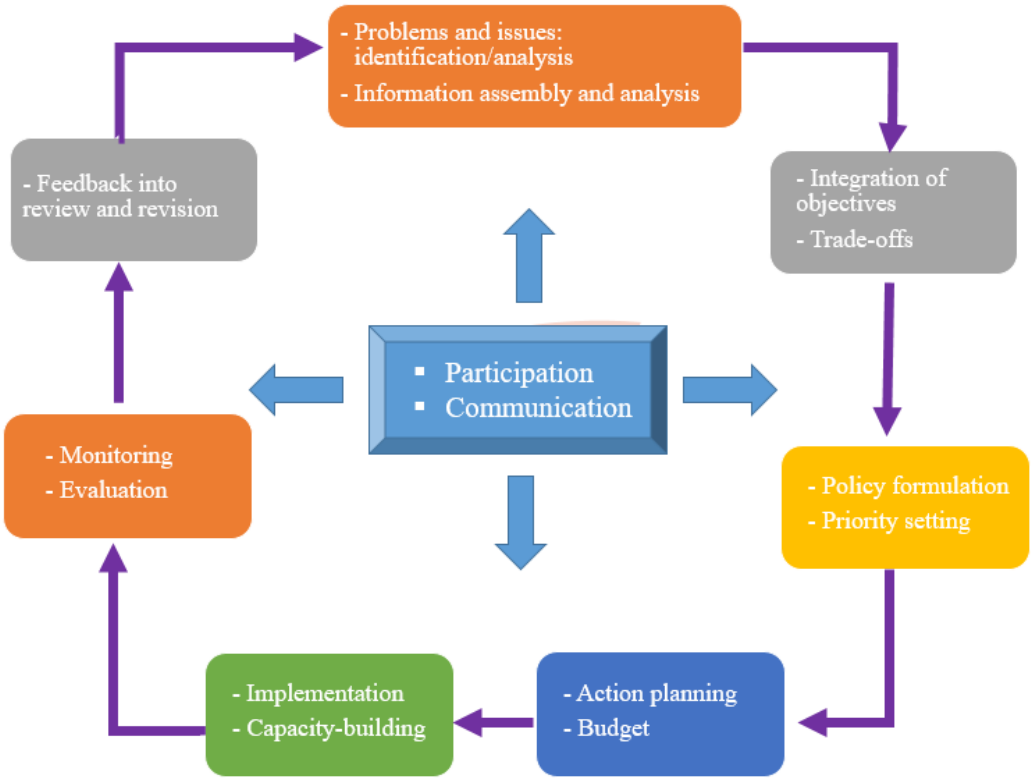

Figure 18. The Strategy Cycle of participation
Source: Bass et al.,1995 from Carew-Reid et al. (1994)

Figure 19. Public participation processes
Source: Burikul (2009)

Burikul (2009) stated that public participation can be used in four working processes of

1) participation in the planning process,
2) participation in the implementation process,
3) participation in benefits and result in the management process, and
4) participation in the monitoring process.

Creighton (2005) stated that public participation could be separated into three phases including

1) Analysis of the decision-making; identify the problem, hearing from stakeholders.
2) Planning process; making the decision with concerned about stakeholders, technics, cost, time
3) Implementation process

Creighton (2005) also argued about the benefits of public participation that it can improve the quality of decisions and spend minimum cost and time. Because of the decision with public participation can clarify the problem from different views among stakeholders. Moreover, the opinions of the participants would be discussed in the participation process. Therefore, the decision plan will be more acceptable and more manageable to implementation. On the other hand, unilateral decision requires shorter time to make, but it would take a longer time for the implementation process because the decision was not accepted by all stakeholders and would cause problems later.

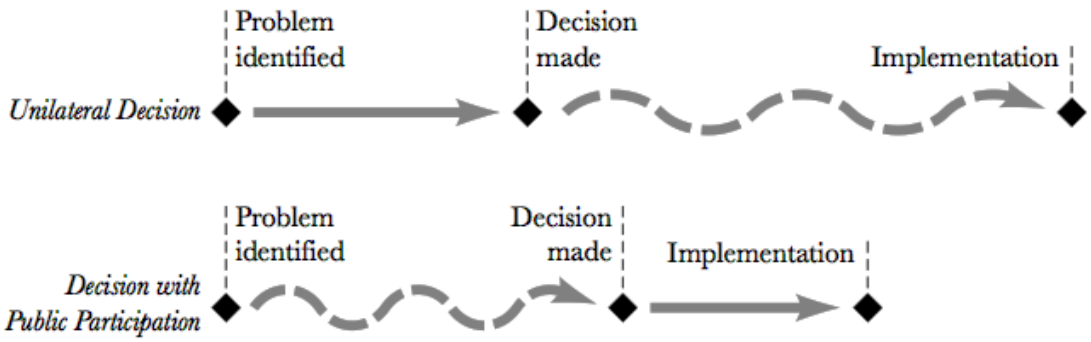

Figure 20. Comparison between Unilateral Decision and decision with public participation
Source: Creighton (2005)

Canadian Environment Assessment Agency suggested that the process of public participation includes three steps

1. Prepare a public participation plan, and this step can be separated into four processes consisting of
    - To establish the objectives; set the objectives of the participation plan that answer the requirements of the development project
    - To develop a strategy by collect preliminary information, identify and contact interested parties, determine the level of participation, design participation activities, set the timelines, allocate financial resources, establish roles and responsibilities, and develop documentation process
    - To prepare detailed plans; design more details of the participation plan that can inform to the implementation
    - Plan to adapt and evaluate; prepare for applying to do and evaluation in the implementation process
2. Implement the plan; implementation follows the participation plan.
3. Evaluate the process; to assess the success of the participation plan with the suggestion to develop the next plan.

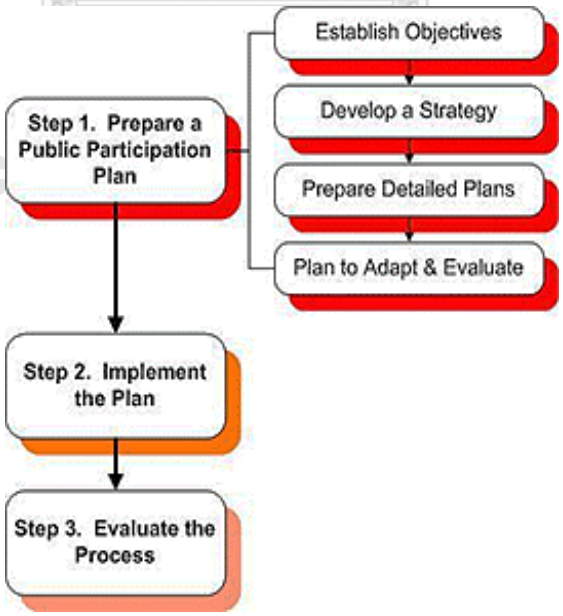

Figure 21. Framework of public participation processes
Source: https://www.ceaa-acee.gc.ca/

Gemmill & Bamidele-Izu (2002) suggested that in the process of public participation, the participation of civil society is one of the most essential for strengthening the participation process. The civil society might play five major roles in global environmental governance, those are,

1) collecting, disseminating, and analyzing information,
2) providing input to agenda-setting and policy development processes,
3) performing operational functions,
4) assessing environmental conditions and monitoring compliance with environmental agreements, and
5) advocating environmental justice.

Because of these important roles of NGOs and civil society in the process of participatory implementation, both have been recognized by the UN, particularly in environmental negotiations.

2.2.4 The instruments of public participation

IAP2 (2007) and Wilcox (1994) described that the instruments of public participation include public meeting, surveys, open houses, workshops, polling, advisory committees and other forms of direct involvement.

Table 3. Participatory techniques categorized by the degree of involvement
Source: Luyet, V. et al. (2012)

Participation technique	Information	Consultation	Collaboration	Co-decision	Empowerment
Newsletter	X				
Reports	X				
Presentations, public hearings	X	X	X		
Internet webpage	X	X			
Interviews, questionnaires and surveys	X	X	X		
Field visit and interactions	X	X	X		
Workshop		X	X	X	X
Participatory mapping			X	X	X
Focus group			X	X	X
Citizen jury		X	X	X	X
Geospatial/ decision support system	X	X	X	X	
Cognitive map	X	X	X		
Role playing			X	X	X
Multicriteria analysis			X	X	
Scenario analysis		X	X	X	X
Consensus conference		X	X	X	X

Luyet, V. et al. (2012) categorized participatory techniques by their degree of involvement. Participatory techniques include newsletter, reports, presentations, public hearings, internet webpage, interviews, questionnaires and surveys, field visit and interactions, workshop, participatory mapping, focus group, citizen jury, geospatial/ decision support system, cognitive map, role-playing, multi-criteria analysis, scenario analysis, consensus conference.

Each technique can be used in different degree of involvement; therefore, development team should select the appropriate technique to be used in their participatory work. In the low degree of involvement (from information level to consultation level) the techniques are newsletter, reports, presentations, public hearings, internet webpage, interviews, questionnaires and surveys, field visit and interactions.

If the development team want to improve the degree of involvement, they need to select other techniques to be used in the co-decision level and empowerment level. These techniques are workshop, participatory mapping, focus group, citizen jury, geospatial/ decision support system, cognitive map, role playing, multi-criteria analysis, scenario analysis and consensus conference.

2.2.5 Advantages and risks of participation

Albert and Passmore (2008) separated the benefits of participation to the benefits for the organization and benefits for the citizen.

A. The benefits for the organization include;

1) helps to build respect and generates trust between groups and individuals,
2) leads to better quality decisions as citizens have a good sense of their needs and offer a source of valuable information,
3) can get the credit from the public in transparency and openness.
4) enables different groups to share the issues they face and come to a better understanding, and generates interest and raises the profile of the organization.

B. The benefits for the citizen include;

1) participation can be educated by learning experience
2) generate a sense of respect, value, and responsibility
3) understanding the tradeoffs that policymakers need to make and therefore developing realistic expectations of what can and cannot be achieved
4) citizenship and ownership – being a good citizen can enhance a sense of belonging and ownership over a service or organization.

Luyet, V. et al. (2012) concluded that **the advantages of participation** are;

1) the decisions will be more reliable and have better quality.
2) the local knowledge will be used in the decision.

3) clarify the issued and problems of the project.

4) integration of various opinions and suggestions from all stakeholders.

5) make the most effective plans and projects.

6) the decision is more accepted by the public.

7) develop social learning with participatory processes.

Luyet, V. et al. (2012) also mentioned the **risks of participation** which include;

1) participation process needed to spend more cost than non-participation.

2) 2)the participation process consumes a longer time than non-participation.

3) it might cause conflicts among each stakeholder.

4) the stakeholders might not be the representative of the public, and

5) the important stakeholder has been promoted to empower.

Irvin & Stansbury (2004) stated that the advantages of public involvement in the decision-making could be separated into benefits (process and outcome) and beneficiaries (government and people). The main advantage of the participants in the decision process is the education that they are learning from the government representatives. In the outcomes, they can gain some control over the policy process that they can make better policy and implementation decisions. On the other hand, the government also learned from the citizens as well. Moreover, they can gain the legitimacy of decisions and can make better policy and implementation decisions.

Table 4. Advantages of Citizen Participation in Government Decision Making
Source: Irvin and Stansbury (2004)

	Advantages to citizen participants	Advantages to government
Decision process	Education (learn from and inform government representatives) Persuade and enlighten government Gain skills for activist citizenship	Education (learn from and inform citizens) Persuade citizens; build trust and allay anxiety or hostility Build strategic alliances Gain legitimacy of decisions
Outcomes	Break gridlock; achieve outcomes Gain some control over policy process Better policy and implementation decisions	Break gridlock; achieve outcomes Avoid litigation costs Better policy and implementation decisions

Table 5. Disadvantages of Citizen Participation in Government Decision Making
Source: Irvin and Stansbury (2004)

	Disdvantages to citizen participants	Disdvantages to government
Decision process	Time consuming (even dull) Pointless if decision is ignored	Time consuming Costly May backfire, creating more hostility toward government
Outcomes	Worse policy decision if heavily influenced by opposing interest groups	Loss of decision-making control Possibility of bad decision that is politically impossible to ignore Less budget for implementation of actual projects

Irvin and Stansbury (2004) also commented that the disadvantages of public involvement in the decision-making could be separated into barriers (process and

outcome) and beneficiaries (government and people). The participation processes consume cost and time, both with the participants and the government. Moreover, this can lead to worse policy decisions and loss of decision-making control.

2.2.6 Drivers and enablers of participation

According to King et al. (1998), the components of the public participation process consisted of four components that were;

1) the problems, issues, situation,
2) the structure of the administration, the system and processes of operation,
3) the power holders or the administrators, and
4) public or stakeholders.

Therefore, the issues or situation problems are the centers of public participation, and the administrators initiate the development processes before bringing public or stakeholders to participate in the project, this process is called conventional participation. In the authentic participation, the participants are required to participate in the development from the beginning of the project. The participants can give suggestions and information to the administrators.

Albert and Passmore (2008) explained about the main drivers for public participation that are;

1) public demand – public needs or requirement is the driver of the public participation,

2) political and managerial rationales - consumer participation to drive improvements in the quality of services (managerial) and citizen or civic participation as a valuable activity in its own right (political),
3) community-led initiatives and campaigning goals – community-led issues can drive citizens to create new mechanisms to voice in development projects.

Albert and Passmore also explained that the enablers of public participation include;

1) Socio-economic circumstance (resources of the locality)
2) Social capital
3) Internal culture and "civic behavior".

2.2.7 Public participation in Thai laws

In the Constitution of the Kingdom of Thailand (2007), a very advanced version of the community right to access public information and in participation. There are sections to protect the person right and community right as follow:

- Section 56. A person shall have the right to be informed and to access public information in the possession of a government agency, State agency, State enterprise or local government organization, except where the disclosure of such information shall affect the security of the State, public safety, the protected interests of other persons, or personal information as provided by law.

- Section 57. A person shall have the right to receive information, explanation and reasons from a government agency, State agency, State enterprise or local government organization before granting a license or undertaking a project or activity which may affect the quality of the environment, health and sanitary conditions, the quality of life or any other material interests concerning him or a local community and shall have the right to express his opinions on such matters to the concerned agencies for their consideration.
- Section 58. A person shall have the right to participate in the decision-making process of State officials in the performance of administrative functions which affect or may affect his rights and liberties.
- Section 59. A person shall have the right to present a petition and to be informed of the result of its consideration within the appropriate time.
- Section 60. A person shall have the right to take legal action against a government agency, State agency, State enterprise, local government organization or other State authority which is a juristic person to assert liability for an act or omission of government officials, officials or employees of such agencies.
- Section 87. The State shall act in compliance with the following public participation policies: (1) to promote public participation in the determination of public policies and economic and social development planning both at national and local levels; (2) to encourage and support public participation in the decision-making process with respect to politics, economic and social development planning and the provision of public services; (3) to encourage and support public participation in the scrutiny of the exercise of State power

at all levels in the form of a professional body or diverse occupational body or in other forms; (4) to strengthening the political power of the people, and to prepare a law establishing a civil politics development fund for supporting the activities of people's groups in communities and for supporting the activities of groups of people that have united into networks of all forms so as to enable their expression of opinions and suggestions of communities' requirements in the localities; (5) to support and provide education to the people in relation to the development of politics and public administration under the democratic regime of government with the King as Head of State, and to encourage the people to exercise their rights to vote honestly and uprightly. Public participation under this section shall pay due regard to the proximate proportion between women and men.

These sections are in line with the Rio Declaration on the right to access public information, access to decision making, and access to justice.

And, in part 12 declared about the community rights as follow:

- Section 66. Persons assembling as a community, local community or traditional local community shall have the right to preserve or restore their customs, local wisdom, arts or good culture of their community and of the nation and participate in the management, maintenance and exploitation of natural resources, the environment and biological diversity in a balanced and sustainable fashion.
- Section 67. The rights of a person to participate with the State and communities in the preservation and exploitation of natural resources and

biological diversity and in the protection, promotion and conservation of the quality of the environment.

- Section 287. People in a locality have the right to participate in the administration of local government organization whereby the local government organization shall facilitate the people to have participation thereto.

However, in the present Constitution of the Kingdom of Thailand (2017) also includes the community right and person right in the right into access information and participation as follow:

- Section 41. A person and a community shall have the right to:
  1) be informed and have access to public data or information in the possession of a State agency as provided by law;
  2) present a petition to a State agency and be informed of the result of its consideration in due time;
  3) take legal action against a State agency as a result of an act or omission of a government official, official or employee of the State agency.
- Section 42. A person shall enjoy the liberty to unite and form an association, co-operative, union, organization, community, or any other group. The restriction of such liberty under paragraph one shall not be imposed except by virtue of a provision of law enacted for the purpose of protecting public interest, for maintaining public order or good morals, or for preventing or eliminating barriers or monopoly.
- Section 43. A person and a community shall have the right to:

1) conserve, revive or promote wisdom, arts, culture, tradition and good customs at both local and national levels;
2) manage, maintain and utilize natural resources, environment and biodiversity in a balanced and sustainable manner, in accordance with the procedures as provided by law;
3) sign a joint petition to propose recommendations to a State agency to carry out any act which will be beneficial to the people or to the community, or refrain from any act which will affect the peaceful living of the people or community, and be notified expeditiously of the result of the consideration thereof, provided that the State agency, in considering such recommendations, shall also permit the people relevant thereto to participate in the consideration process in accordance with the procedures as provided by law;
4) establish a community welfare system.

The rights of a person and a community under paragraph one shall also include the right to collaborate with a local administrative organization or the State to carry out such act.

In addition, the Environment and Conservation of National Quality Act (1992), Article 6 declared to protect people and community in the participation activity, including redress subsidy, and Article 7-8 about NGOs (Non-Government Organizations) roles in people and community participation in the environmental conservation.

2.2.8 Guidelines for public participation

Bryson, Quick, Slotterback, and Crosby (2013) published the Design Guidelines for Public Participation divided into 3 processes with 12 guidelines as follow:

Figure 22. The cycle of public participation process design and redesign (numbers indicate the corresponding design guidelines.)
Source: Bryson et al. (2013)

A) Assess and design for context and purpose

1. Assess and fit the design to the context and the problem

2. Identify purposes and design to achieve them

B) Enlist resources and manage the participation

3. Analyze and appropriately involve stakeholders

4. Work with stakeholders to establish the legitimacy of the process

5. Foster effective leadership

6. Seek resources for and through participation

7. Create appropriate rules and structures to guide the process

8. Use inclusive processes to engage diversity productively

9. Manage power dynamics

10. Use technologies of various kinds to achieve participation purposes

C) Evaluate and redesign continuously

11. Develop and use evaluation measures

12. Design and redesign

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Research framework

The research framework of the study is developed in order to understand the processes and practices of co-creating built environment in the context of Thailand through the description and analysis of selected cases, ranging from micro to macro scales. Key success factors, problems and obstacles in the implementation of co-creation concept are then identified through a major case study of Ban Moh Community. This chapter describes research methods and process.

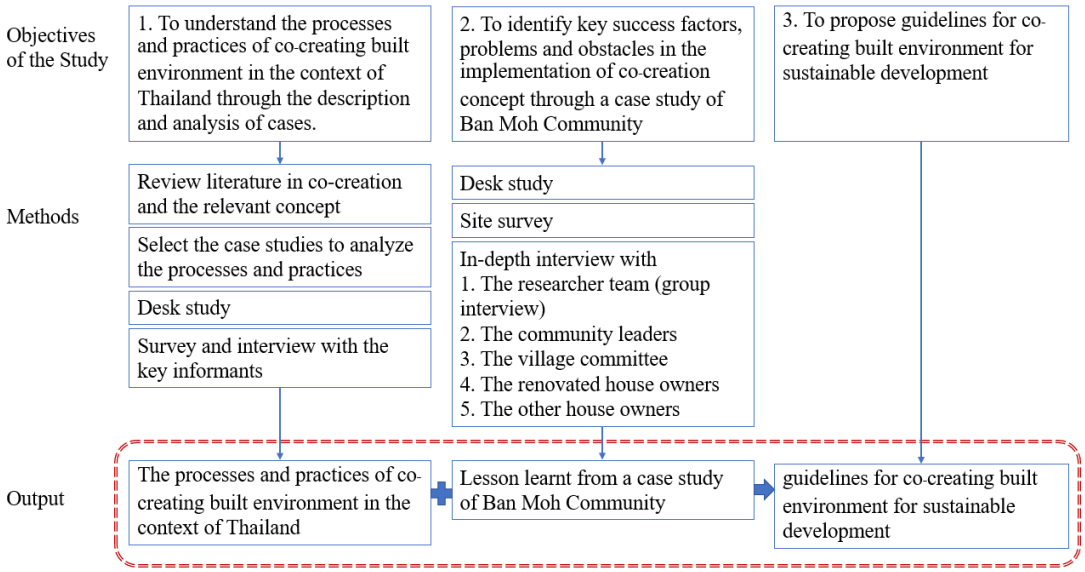

Figure 23. Research process

3.2 Research design

The research framework is developed from the objectives of the study, starting from reviewing the literature on the co-creation concept, including relevant concepts such as co-design, participatory design, and public participation. Then cases are reviewed and selected to explore the processes of co-creation. The author incorporates these steps into research design:

1. Select the outstanding case studies for analyzing.
2. Desk study to understand the background, practices, and processes of the projects.
3. Site survey in the cases of Ban Pred Nai (Trat Province) and Chanthaboon Riverfront Community (Chanta Buri Province).
4. Interviews with the key informants such as the community leaders, the researchers, the designers, and the house owners.

The main site of this research is in Ban Moh, Maha Sarakham Province. First, the author conducts desk study from the project documents to understand the background of the community and the development process in the year 2005-2006. The village maps, the architectural drawings, and old photographs are compared with the conditions in the present. After the desk study, the author surveys the real site to collect the physical information, including the house conditions, infrastructures, and the community pottery center. Furthermore, the author conducts in-depth interviews with the key informants from different stakeholders' group and checked the data by triangulation. The key informants include;

1. The research team (by individual interviews and group interviews)
2. The community leaders
3. The village committee
4. The renovated house owners
5. The other house owners not involved in the house renovation project.

Table 6. The detail of the informants in a case of Ban Moh

Informants	Status	Remarks	Number
Ban Moh residents	community leaders	Assistant headman and head of the Village Health Volunteer	2
	village committee		3
	renovated house owners		5
	house owners not involved in renovation project		2
Researchers from Mahasarakham University	head of the project		1
	researchers	Lecturers and students	10

Data collection and data analysis brought lessons learned from a case study of Ban Moh community, including methods, project processes, key success factors, problems, and obstacles in the project implementation.

Furthermore, the author brings the findings from a Ban Moh case to compare with the other case studies for analyzing the problems and suggesting solutions. These findings

are developed for making the guidelines for co-creating built environment for sustainable development.

Table 7. The detail of the informants in other cases

Case	Informants	Number
Chum Saeng	Community architect	3
Chanthaboon community	Community leader	1
Ban Pred Nai community	Community leaders	3
Baan Mun Khong	Officer and researcher	2
Community hospital	Community architect	2

3.3 Research methods

This study develops the research methodology by, 1) identify the datasets and data collection method, 2) develop the guideline questions, and 3) prepare data analysis method.

3.3.1 Datasets and data collection

This research is a qualitative research with case studies methodology, starting from reviewing secondary data in desk study such as research reports, books, newspapers, and media. Then the author does the field surveys using observation and conversation to obtain empirical data, then makes preliminary analysis from those data. Next step is conducting focus group discussions with relevant persons and then in-depth interviews with the key persons to find out the details and to cross-check the findings.

These findings are used to understand and assess co-creation and to develop recommendations and guidelines for sustainable co-creation of built environment. The data collection in this study is shown in the table below.

Table 8. The datasets and data collection

Datasets	Data collection
Review background problems and context of a case study	- Secondary data study - Field study
Built environment physical conditions and usability	- Field study -observation - Interview with the real users
The design and the construction of built environment	- Secondary data study - Field study
Qualitative data - Key success factors - Processes and practices - Problems and obstacles - Activities, tools and techniques - Stakeholders, roles and timeline - Leadership - Trust - Social relationship - Communication - Community values - Belief, rituals, norms	- Secondary data study - Field study - In-depth interviews - Group interviews

Datasets	Data collection
- Attitudes and awareness - Suggestions and comments	

3.3.2 Guideline questions

Guideline questions are developed from the research framework using the design thinking process with the stakeholders. The stakeholders are categorized into three groups consisting of, 1) the real users, 2) the professionals (researchers and professional designers), and 3) the supporting organizations.

The in-depth interviews are conducted with the selected representatives from the real user group and the professional group. The types of questions for in-depth interviews can be divided into five categories (please see detail in Appendix A, B and C):

a) Personal data of the informants including gender, age, role in the co-creation, time period in co-creation, professional background and experience in co-creation. b) Context and background of the community including occupation, economic status, social capital of the community, background history of the community, the usage of shared resources.

c) Input variable: initiative factors of the project, the relationship between the leader and the stakeholders, internal factors of the community and the external factors from the participated people and organizations. d) Process: co-creation process, value co-

creation, co-created activities, the methods and tools in the co-creation processes. e) Output and outcome of the co-creation project consisting of physical output such as the usage of the created built environment and the overall environment of the community, and social output such as the co-created value of the community, the strength of the community, the well-being of the members, etc.

3.3.3 Data analysis method

The aggregated data are analyzed to follow the research framework of the study. Factors in the co-creation of built environment are identified, along with the relationship between factors in order to understand processes as well as key success factors, problems and obstacles in the implementation of co-creation concept.

The lessons learned from these case studies, especially the major case of Ban Moh community, will be analyzed and summarized into the proposed guidelines that may be applied to other co-creation of built environment projects.

3.4 The Study area, stakeholders and main issues to analyze

Ban Moh is the traditional pottery community in Mahasarakham Province. Ban Moh housing renovation is the pioneer development project in the North-eastern region under the self-reliance scheme of the National Housing Authority (NHA). There are other projects in different parts of the country, but this project is unique in that it uses co-creation concept as a starting point. The researchers collaborated with the community in the creation from the beginning stage through the construction stage.

However, the development project was terminated before the final stage. This study finds out the reasons why the project could not be completed and not all houses in the community were improved and renovated.

3.4.1 Stakeholders in the development project.

The stakeholders in the case study of Ban Moh are from the various parts as follow:

- The researchers including lecturers and students from the Faculty of Architecture, Urban Design and Creative Arts, Mahasarakham University
- the National Housing Authority (NHA) as the research funding organization
- Local government, Subdistrict Administrative Organization (SAO)
- The community leaders
- The village committee
- The owners of the renovated houses
- The households that not included in the house improvement phase
- The community craftsmen (set up in this project)
- The owners of construction materials or hardware shops

3.4.2 Ban Moh development project in 2005-2006

National Housing Authority (NHA) offered the research funding for the study on rural housing development in Thailand to find suitable solutions for the low-income rural villagers. Ban Moh village was a pilot project of the North-eastern region to study

and to implement the rural housing development plan by the Faculty of Architecture, Mahasarakham University in 2005.

The development project focused upon and supported people's participation to build “the self-reliance community” concept to lead the village to the path of sustainable development. In the project, all agreed to the setting up of a loan for financial support to the community members for house renovation and improvement. After the houses were renovated, then the money would be returned to the Renovation Fund by installments so that the loan could be circulated to the other members of the community.

Figure 24. The location of Ban Mo community, Mahasarakham Province
Source: Google map, edited by author

Figure 25. Map of Ban Moh community, Mahasarakham Province
Source: *Research staff, edited by author*

National Housing Authority (NHA) and Mahasarakham University conducted the research and implementation project in two phases, 1) Ban Moh community survey phase where the research focused upon making base maps and measurement works in 2005, and 2) implementation phase where the fund management was carried out to build the community center, to improve infrastructure, and to co-create housing renovation activities in 2006.

1. Main issues about co-creation activities in Ban Moh Project

Although Ban Moh Project used the concept and practice of "Ruam Khid Ruam Tham" (in Thai language) or "Thinking and Doing Together" instead of "co-creation", the process can be seen as co-creation in improving built environment. The project researchers developed a guideline for house improvement through

participatory process with survey and interview of 140 households. Afterwards, 30 houses were selected by the self-relied approach. Later, a guideline for landlocked households (caused by dense setting) in the settlement was drafted, again with the participatory process where the villagers collectively participated in thinking, planning and eventually acting in order to improve the living quality and village environment together.

2. The conclusion from the study and action process was that the project represented "two-way development" in which the community made a plan and ran the process through the village committee and in turn, the committee were supported by local government and researchers.
3. The main issue is that participation in the process of designing and renovating houses seem to be successful, but the problems remained afterwards are that some homeowners borrowed the construction materials to renovate their houses but did not pay the money back to the HDF, and the HDF could not collect the debt. As a result, the HDF did not have enough funding to develop the rest of the houses in the community. Finally, the researchers helped the HDF to write a report and to close the project bank account.

Through the research methods mentioned above, the author collects the data about different cases, including Ban Moh case. By analyzing those data, the author describes factors of success and causes of problems and weaknesses in co-creation projects. The knowledge is then used to develop guidelines for the co-creating built environment for sustainable development.

CHAPTER 4
SELECTED CASE STUDIES ON CO-CREATING BUILT ENVIRONMENT IN THAILAND CONTEXT

This chapter focuses on the selected case studies about co-creating built environment in Thailand. These cases are described and analyzed in order to understand the concept, processes and practices of co-creation from different projects ranging in size and site in the context of Thailand.

4.1 Co-creating built environment projects in Thailand

The concept of "co-creating built environment" is often blended with the concept of "participatory design". From the interviews, the researchers and the architects from different design firms and organizations in various cases use both words with the same meaning. They use "co-creation" as the participatory design development project that allowed multi-stakeholders from the various organizations to collaborative design with the users.

Arsom Silp Institute of the Arts has been active in the field of participatory design especially in their work on "the participatory architecture for change" applied in the preservation and revitalization of the Chanthaboon riverfront community and other projects since 2009 (Arsom Silp Institute of the Arts (2017). The pioneering project in

Thailand that uses the term “co-creation” is “the co-creating Charoenkrung project” in 2016 and “the co-creating Chum Saeng project” in the same year. The co-creating Charoenkrung project was originated by collaborative work between the Thai Health Promotion Foundation and Thailand Creative and Design Centre (TCDC) (www.tcdc.or.th), while the co-creating Chum Saeng project was organized by the Community Architects Network (CAN).

Even before the use of the term “co-creation” by TCDC, many development projects operated by the method of participatory design with the users including community members and other stakeholders from the different organizations. Nowadays, the term co-creation has been used widely in the field of built environmental design, from product design, architectural design, and particularly in the community design and city planning.

The well-known co-creation in an architectural design projects are the participatory designed hospital at Koh Yao Yai island in Phang Nga Province, followed by the Benchalak Chaloem Phrakiat Hospital in Sisaket Province and Phanom Dong Rak Hospital in Surin Province. These projects were developed by the CROSSs community architect firm. The hospital designs are not from the ideas of architects and owners alone, but from those of the users of the hospital. The participatory methods were group discussions, map and plan drawings, ideas sketching, model making, etc. The intention was to listen to the actual needs of the people involved, then made an adjustment to become the type of a “dream hospital.”

Co-creation has been applied for finding the solution in community development, like the project on co-creating Chum Saeng in 2016. The project was organized by The

Community Architects Network (CAN), which is a network of architects, planners, researchers, and institutions across Asia that work on community-driven projects. Co-creating Chum Saeng project held eight days workshop in July 2016, then created strategies and areas for development while allowing their areas and ideas to be established together with nature. CAN integrated communities and built environment experts from 15 Asian and non-Asian countries, and approximately 180 people attended the workshop.

Figure 26. Co-creating Chum Saeng workshop
Source: Huang and Castanas (2016)

The organizations that collaborated and co-hosted the event included Asian Coalition for Housing Rights (ACHR), Community Organization Development Institute

(CODI), Association of Siamese Architects under Royal Patronage (ASA), Community Act Network (CAN), Phranakhon Rajabhat University, Chum Saeng Municipality, and Chum Saeng My Beloved civic group (Huang & Castanas, 2016). This project emphasized community-led processes to find out the vision and solution for improving the district.

4.2 Selected case studies to understand co-creation

There are several projects that used the idea of public participation in design. If we map the timeline for these projects, some can be traced back since 2000s and started from community-based projects. The projects on co-creating individual building or architecture started around 2009, and 2016 is the year when the word "co-creation" was popularized.

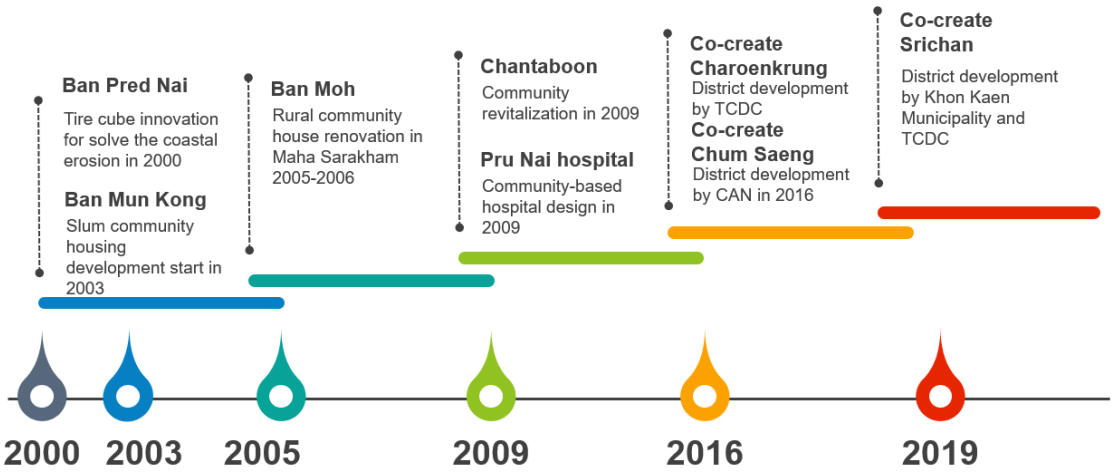

Figure 27. Timeline of the co-creating built environment projects
Source: author

This study selects the outstanding co-created built environment projects with the criteria as follow:

1. operated with co-creation in the built environment or co-design approach
2. co-created with the researchers or the designers from the research institute (use the knowledge in the development process)
3. shared community resource was taken into consideration in the project planning and implementation
4. inclusive development (that means no one was left behind) was one of the project principles
5. has been well known or considered a pioneer in participatory development approach

The selected projects by these criteria are:

1. Chanthaboon riverfront community which used co-creation in renovation of built environment and community development in Chanthaburi Province
2. Ban Pred Nai community which used co-creation in sustainable mangrove forest management and built environment development in Trat Province
3. Baan Mun Khong Housing Project or community-driven slum upgrading and community housing development at national scale by Community Organization Development Institute (CODI). Co-creation approach is used in designing built environment and community.

4. Community hospital at Pru Nai, Koh Yao Yai --participatory designed hospital in Phang Nga Province

Table 9. Criteria and attributes of the co-creating built environment projects

Criteria	Chanthaboon community	Ban Pred Nai community	Baan Mun Khong Housing Project	Pru Nai hospital
1. Co-creation approach	Used for architectural and community renovation	Used for community natural resource management	Used for community housing development	Used for designing community hospital
2. Research institute	Arsom Silp Institute of the Arts	(The Center for People and Forests) RECOFTC	Community Organization Development Institute (CODI) researchers	Thammasat University
3. Shared community resource	Cultural and tourism resource	Natural resource (mangrove forest)	Space for slum upgrading area	Natural resource (island)
4. Inclusive development	Yes	Yes	Yes	Yes
5. Well known or a pioneer project	Awarded from ASA, FuturArc, UNESCO	Awarded from UNDP and Green globe award	Well known for people-driven housing development	Pioneer in participatory design hospital

To understand and analyze these cases, the author uses documentary reviews, field visits, and in-depth interviews with the key informants including:

Table 10. Lists of interviewed key informants

Case	Status	Name(s)
Chantaboon community	Community leaders	Ms.Praphaphan Chatmalai
Ban Pred Nai community	Community leaders	Mr.Amporn Patsart, Mr.Manoch Peungrung, and Mr.Supakij Huangnam
Baan Mun Khong Housing Project	Researchers	Mr.Wiroondej Kaewpoon (CODI) and Assistant Professor Dr.Sakkarin Saephu
Pru Nai community hospital	Researchers	Mr.Mek Sayasewi (co-founder and community architect from CROSSs)

4.3 The case study of Chanthaboon riverfront community, Chanthaburi Province

Chanthaboon riverfront community is the renovation and community development project that used the concept and process of co-creation in built environment. This project was developed by the villagers in the community and co-created with the Arsom Silp Institute of the Arts.

This project results in a well-known social enterprise, which means the community invested in the boutique hotel business. The main business shareholders are the community members, and the rest are from outside the community. Therefore, stakeholders of this co-created built environment include those from inside and outside this community.

The guaranteed awards of the Chanthaboon riverfront community are

- Winner award in Socially Inclusiveness from FuturArc Green Leadership Award (2015).
- Award of Merit from UNESCO Asia-Pacific Awards for Cultural Heritage Conservation (2015)
- Architectural Conservation Award in Outstanding and Architectural Design
- Citation Award from the Association of Siamese Architect under Royal Patronage

4.3.1 Background problems of the co-creation project

Chanthaboon riverfront community is the old trade community with over 300 years of history. One of the buildings, Bann Luang Rajamaitri, the UNESCO awarded project, was renovated by the agreement of community members. The researchers and architects were from Arsom Silp Institute of the Arts, and they used participatory design method to renovate the Chanthaboon riverfront community, This was done through the collaboration with the local government organization and the community members. All stakeholders agreed to the shared vision of " culture-led business development " (Sukmanee, 2015).

Before the implementation of the project, the stakeholders identified the problems as: (Arsom Silp Institute of the Arts, 2017)

- The community had a high historical value but the value was not recognized.
- It was very quiet community with sluggish economy.
- The members of the community consist mostly of elderly members, and there is a lack of working age members.

4.3.2 Co-creation activities

After the problems were identified, then participatory planning began with the suggestions of:

1. Discovering and reviving the value of the community through " junior archaeologists" activities.
2. Building community unity with community naming contest, and setting a shared vision of "culture-led business development"
3. Starting community clean-ups activities.
4. Organizing "Vernadoc" (Vernacular Architecture Documentation) activities to encourage community appreciation of their architecture.
5. Renovating of Ban Khun Anusorn Sombat as a community learning center and organizing cultural events in the community.
6. Setting up a social enterprise for conservation to create a conservation model that benefits the community.

4.3.3 Community renovation and rehabilitation

In the year 2009-2011, the community was rehabilitated with cooperation from the people in the community, Chanthaburi Commercial Office and the researchers from Arsom Silp Institute of the Arts (Boonyakan & Sujachaya, 2015). This is the timeline of the project:

- The renovation of Ban Luang Rajamaitri Historic Inn as a social business model for conservation in the area.
- Community opens their residences as the learning houses to revive the vitality of the community.

- The community becomes an important cultural tourism destination and a place for a "study tour" for other old communities to learn about this co-creation model. Eventually it becomes "Chanthaboon model" (Arsom Silp, 2017)

Figure 28. Chanthaboon riverfront community map
Source: photograph by Benjarat Prompen

Figure 29. The Chanthaboon riverfront community, a view from the bridge
Source: photograph by Benjarat Prompen

Figure 30. Luang Rajaamaitri Historical House (Boutique hotel).

Source: photograph by Benjarat Prompen

Figure 31. Author interviews with the community leader, Ms.Praphaphan Chatmalai at Chanthaboon Community Learning Center

Source: photograph by Benjarat Prompen and author

4.4 The case study of Ban Pred Nai, Trat Province

Ban Pred Nai is acommunity well-known for its sustainable mangrove forest management. The village is located in Huang Nam Khao sub-district, Muang district of Trat province. Ban Pred Nai is a significant case to study the co-creation both in the natural environment and the built environment. These activities are led by the local villagers because of their awareness of the importance of their environment. Ban Pred Nai received many awards from different institutes and organizations, for instance;

- Equator Initiative Award from UNDP in 2004 in “local sustainable development solutions for people, nature, and resilient communities”
- Green globe award from Petroleum Authority of Thailand (PTT)

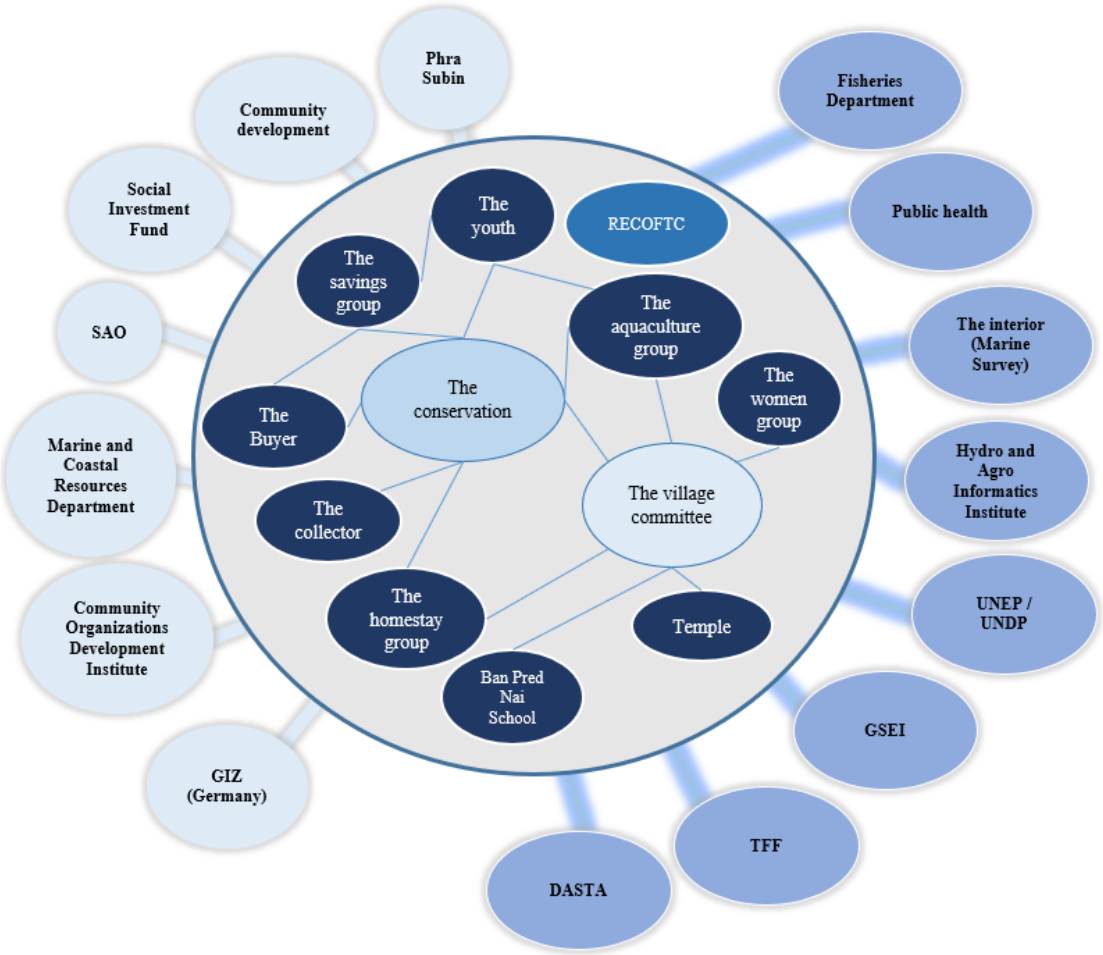

Figure 32. Stakeholders in Ban Pred Nai
Source: adapted from RECOFTC (2011)

4.4.1 Stakeholders in Ban Pred Nai

There are many stakeholders and many organizations in the co-creation projects of Ban Pred Nai as in the figure above.

1) Internal stakeholders

I. The major group that manages the mangrove forest is "Ban Pred Nai mangrove forest conservation and development group".

II. The minor groups in the community.

- The savings group
- The homestay group
- The fishery group
- The aquaculture group
- The women group
- The youth group
- Ban Pred Nai School
- Ban Pred Nai Temple

2) External supported stakeholders (adapted from RECOFTC 2011)

- Subdistrict Administrative Organization (SAO)
- Royal Forest Department
- Marine and Coastal Resources Department
- Fisheries Department
- Marine Police Division
- The Center for People and Forests (RECOFTC)
- Good Governance for Social Development and the Environment Institute (GSEI)
- Hydro and Agro Informatics Institute
- Thai Health Promotion Fund
- Social Investment Fund
- GIZ (Germany)
- Community Organizations Development Institute (CODI)

- Thai Fund Foundation

4.4.2 Co-creating built environment in Ban Pred Nai

Co-creating built environment in Ban Pred Nai consisted of several infrastructure, projects and activities like:

- Innovation for coastal erosion protection: local wisdom of "Tao-yang" (tire cubes)
- Trail and tower for studying and monitoring the biodiversity in the mangrove forest
- Community center: meeting room, multipurpose space, office, and shops
- Community museum: the learning center of Ban Pred Nai community.
- Homestay and local guide development
- Infrastructure: water shortage management with Royal Theory
- Energy: solar energy for farms and some houses + biomass stoves development
- Conservation of aquatic animals: fish house & crab bank

The most well-known built environment of Ban Pred Nai is the tire cube for protecting coastal erosion. This is the co-creating innovation by the villagers. From an interview with Mr.Amporn Patsart, one of the community leaders, the tire cubes were invented because the villagers had to protect the coastal destruction by the illegal fishery boats. The bamboo sticks could not stop those boats. Each tire cube is made from 6 tires with the casting concrete at the bottom for absorbing the waves and

currents and thus protecting the coast. This idea was generated from the group of community leaders and everyone in the community decided to co-create these together. They used the community fund and asked for tires that did not pass quality standards from a private tire company for free. Therefore, the community could do this project by themselves without having to seek support from any government agencies.

4.4.3 The strength of Ban Pred Nai community is as follow:

- Strong community cooperation and value co-creation.
- Strong village head and supporting team.
- Strong social system with dynamic development
- Effective savings group that extends social welfare support for the members
- Environmental awareness in different generations.

From the interviews, the system and mechanism of the Ban Pred Nai community are based on the economy, including the savings group and social welfare system. The group collects money monthly from members to circulate and save on group funds. The relationships between the villagers are very close because the community is a kin-based society with the sense of interdependence. This strong social tie helps putting pressure on those in debt to the savings groups, and debt collection is operated by the community committee.

Figure 33. Author interviews with one of Ban Pred Nai community leaders, Mr.Supakij Huangnam

Source: photograph by Benjarat Prompen

Figure 34. The villagers carry tires to build tire cubes for protecting shoreline
Source: website of Ban Pred Nai

Figure 35. Tire cubes and the crane built with local knowledge
Source: website of Ban Pred Nai

4.5 The case study of Baan Mun Khong Housing Project

Baan Mun Khong Housing Project is the urban poor housing development driven by the community and local organizations. The main problem with urban poor communities is that they are alleged to encroach on private lands, therefore the issue of illegal occupation is very important and this has the implication on receiving public facilities.

The concept of Baan Mun Khong is from community self-management for strengthening their community to handle the problem themselves (with people, community connections, capital, and job creation. The community designs and co-

creates development processes and activities on their own with the support from researchers and local organizations.

Financial support in the project is from Baan Mun Khong Housing Project fund that lends money and contributes conditionally. There is a process to develop and strengthen the savings groups/cooperatives of the community. The development has a system to take care of people, land, houses, and risk prevention systems (The Community Organizations Development Institute (CODI) in Thailand, 2015).

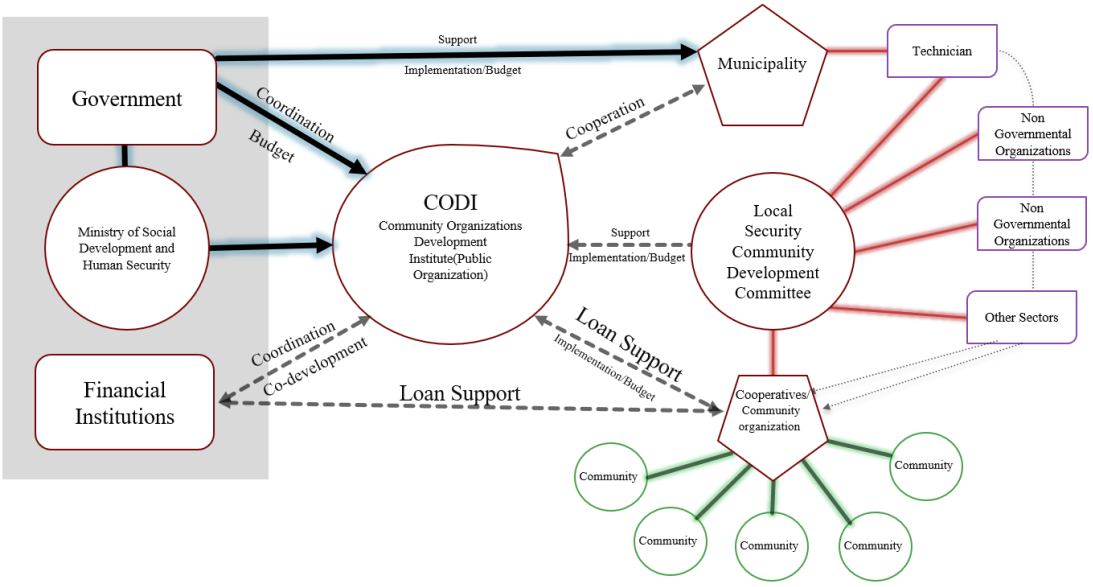

Figure 36. The relationship of the project implementation mechanism of Baan Mun Khong Housing Project
Source: The Community Organizations Development Institute (CODI) in Thailand (2015) adapted by author

Baan Mun Khong Housing Project succeeds in social management because it has been driven by the community with the supported knowledge from CODI. The social system and finance system are the strength of the project to control the behaviors of the members like credit management by community organizations. The participatory

design method has been applied in the design process of village planning and house design. The competent financial mechanism, including the financial control and risk management that operated by the savings group, led the project to sustainability.

The conclusion from Baan Mun Khong Housing Project is the participatory design in the project that brought satisfaction to the house owners and community. Still, the sustainability in Baan Mun Khong Housing Project has come from mechanism in the social and economic system co-created by the community.

In addition, Thailand Development Research Institute (2014) assessed the added value from the Baan Mun Khong Housing Project and reported that in terms of economy, the project reduced household expense especially electricity and water bill, because through the formal project arrangement, the house owners can use the electric and water legally, and the people in the community change their status from "illegal encroachers" to "dignified citizens".

As for the social benefits, there is statistical evidence confirming that community members who are students spend more time studying because they can concentrate more in better home environment. Besides, with better management of the community, pollution is reduced, and improved environment results in better health of the people in the community. In addition, the chance of fire is reduced. Finally, people in the community are proud to have a pleasant home in a warm neighborhood.

This study chooses the case of Baan Mun Khong Housing Project in Ta Kok community in Samut Prakan Province.

4.5.1 Background of the study area

Ta Kok community is a subset of the Khlong Ta Kok community. In the old days the people here used to be fishermen who settled around the mouth of Ta Kok waterway located about 200 meters from the Gulf of Thailand.

In the past 70 years, the people in the community lived near Old Sukhumvit Road, on the property that belongs to the Highway District and the Treasury Department. When economic progress brought industrial plants to Samut Prakan Province, fishing from the shore is no longer so profitable. Villagers started working in the industrial plants, and only 20 percent remain as fishermen.

In 2005 the Thai government expanded Old Sukhumvit road to support increased commercial traffic brought on by the construction of Suvarnabhumi Airport. The Highway District sent eviction notices to many households in Ta Kok community, and that marked the beginning of a significant change. At this point, community architects from Arsom Silp Institute of the Arts stepped in, doing fieldwork and information exchange to help the community reach a good outcome (Arsom Silp Institute of the Arts, 2017).

Figure 37. The Ta Kok community
Source: Facebook of Arsom Silp Institute of the Arts

4.5.2 Problems which inspire co-creation solution

The problems which inspire co-creation solution can be summarized as follow:

- The former fishing community became congested.
- Property rights belong to the Highway District and the Treasury Department.
- Tidal ebb and flow cause trashy flooded areas.
- The housing was unhygienic.
- The Highway District evicted people to widen the road.
- The villagers on Highway District land wanted to move onto Treasury Department property, so they joined Baan Mun Khong Housing Projec, tear down old houses, filled in the mangrove forest land mapped out a new community, and built new houses.

- The villagers on Treasury Department Land did not want to join the project, so the villagers broke into two disputing sides.

4.5.3 Co-creation activities

The architects from Arsom Silp Institute of the Arts came in and made community assessment. They discovered that unlike the adults and elders, the children are not involved in the conflict between the two groups. So, they used children's activities to build friendship and trust and to reduce conflict between the two adult factions. The activities made the people talk to one another, and talking together eased differences.

The next step was to create common community development goals. Then tours were organized to view the benefits of caring for forested wetlands. The community then co-designed a new plan, dividing the village into smaller units. Afterwards, workshops were organized for the community members to take pictures of "things that I like and dislike". The community plan was then adjusted, with more effort put in for mangrove forest conservation. After the plan was co-created, the villagers put in their labor to build structures together to save budget money.

4.5.4 The drive for community development as a result of co-creation activities, the community coexists with mangrove forest, wetlands and urban development. When the houses in the community were built on

stilts to avoid flooding, the people are more willing to live near wetlands. The mangrove forest became community forest. Each house has an open deck in front of the house for socializing. At the community level, there are community center, children's playground, community market. Co-creating built environment in Ta Kok community promoted strong community cooperation, and the community has changed from crowded urban poor community to the one that elevates people's quality of life.

4.5.5 A case study of Ban Eua Arthorn

It will be useful to compare Baan Mun Khong Housing Project with similar development project as Ban Eua Arthorn. Ban Eua Arthorn is the housing project implemented by the National Housing Authority (NHA) for solving the problem of instability in living to alleviate suffering and improve the quality of life for the underprivileged, low-income groups. This project is supported by the Government Housing Bank (GHB) which provides credit support for the selected people who are entitled to buy houses in Ban Eua Arthorn project. The feasibility of the project depends on the policy of NHA to select the land for developing housing projects.

The critical problems of Ban Eua Arthorn project are as follow:

1) It does not meet the needs of users because homeowners are not included in the design development process. Therefore, the functions of the house do not match the user's lifestyle.

2) The community has a weak social system because the homeowners cannot choose the neighbors, and the villagers' relationship is not promoted like in Baan Mun Khong Housing Project where the people know one another before developing the village plan.

In addition, there are many problems in different project sites, such as the houses in the project are left unsold because the sites are in the inconvenience areas. In some communities, there are social problems like drug addiction and theft because of community weakness and the villagers came from different places so they do not know one another.

Although the juristic person office handles the community infrastructure and facilities, there are still environmental problems like garbage and wastewater. Dwelling units in the project are too small to fit the user's living space because of the low budget. However, this project still continues because it answers the financial aspect for low-income families, and GHB can enforce debt collection from the house owners by legal measures.

Table 11. Comparison between the housing development projects

Case	Ban Eua Arthorn Project	Baan Mun Khong Housing Project
Project owner	NHA	CODI
Concept	Housing project for low-income people	Urban poor housing development by community and local organizations
Facilitator/funder	GHB	Community organization supported by researchers and local organizations

Case	Ban Eua Arthorn Project	Baan Mun Khong Housing Project
User involvement	none	Villagers set up a group from the old slum for developing the new village
Environment	New settlement on new land with new residents	Settlement co-designed by the people in the community
Funding	Loans from GHB enforced by legal measures	Community organization uses the savings group for the initial fund with loan from financial institute and CODI
Social setting	The residents cannot select the neighbors	The residents gradually build their neighborliness
Operating agency	The project operation is handled by the juristic person office	There is project committee and various community groups especially savings group

Source: Author

4.6 The case study of Pru Nai community hospital, Koh Yao Yai, Phang Nga Province

4.6.1 Background of the project

The standard design of the general hospitals may not suit the needs of the community, so participatory design has been used in this pioneer project in Phang Nga Province. Marut Lekpet, a medical doctor at Pru Nai hospital, is the leader of this participatory hospital design. He uses Family Medicine as the concept to build the value at this small hospital. The team of a master's degree student and the researchers from Thammasat University along with community architects used “deep listening method” to empathize with the villagers at the Pru Nai community. The team used participatory action research and conducted participatory design with the local people and the hospital staff.

Stakeholders in this project consisted of university researchers, community architects, the medical doctor, nurses and his hospital staff, and community members.

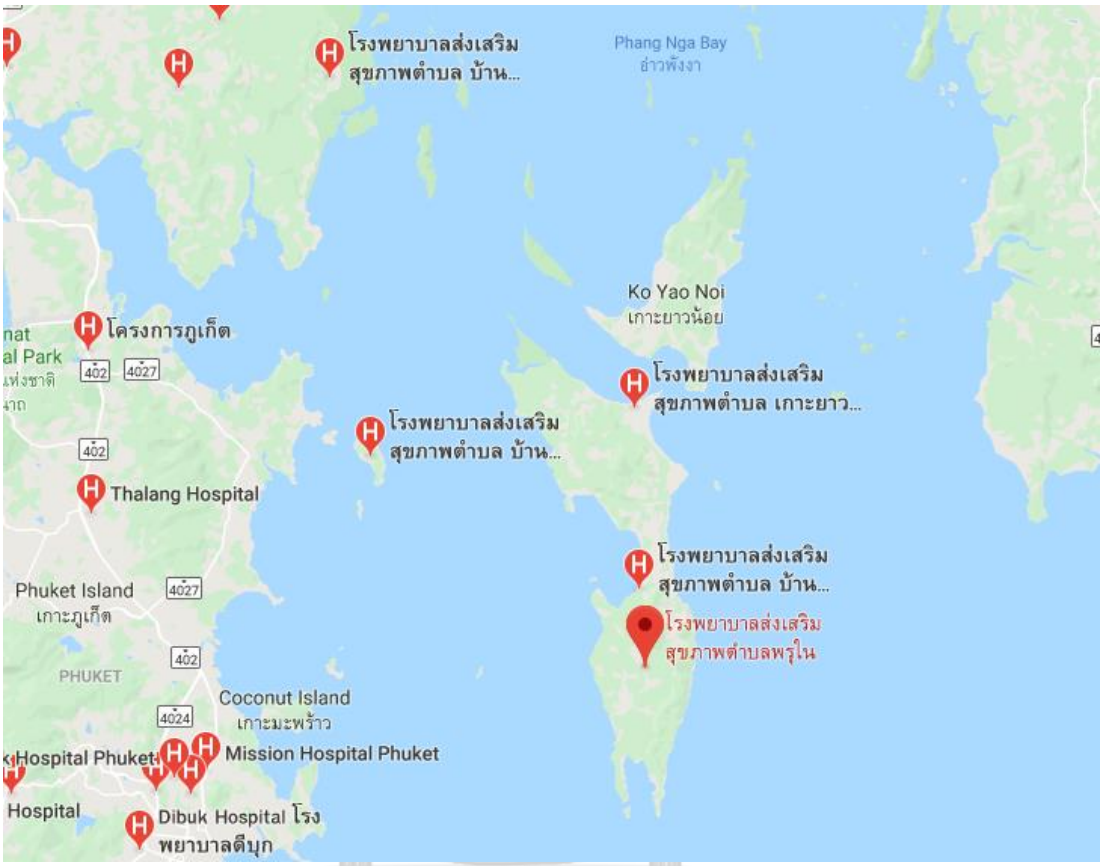

Figure 38. Map of Pru Nai, Koh Yao Yai, Phang Nga province
Source: Google map

Figure 39. Site plan sketched by the doctor of Pru Nai community hospital
Source: Sayasevi (2011)

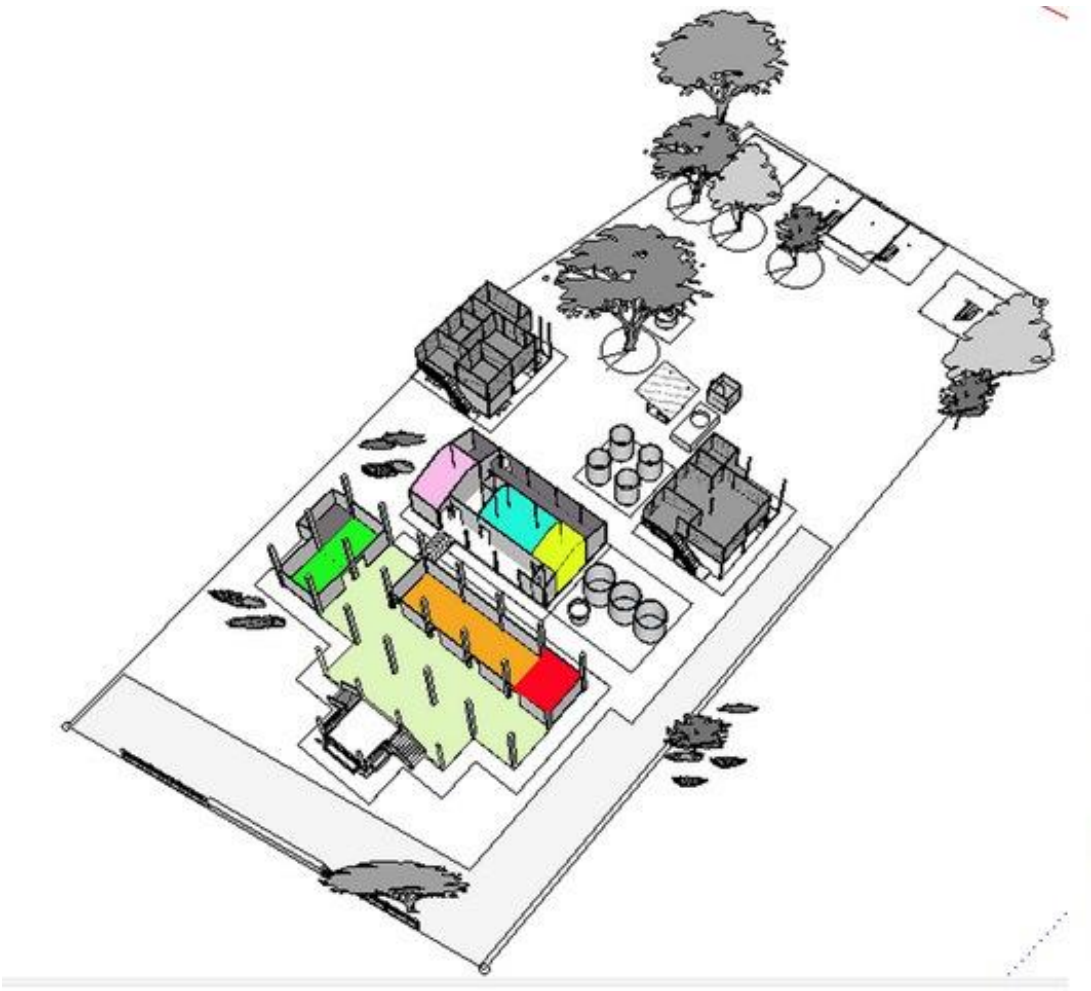

Figure 40. Pru Nai community hospital site plan
Source: Ratanakot (2018)

4.6.2 Processes of work

The design process started from the involvement of the local people in the problem identification stage. Then the doctor, nurses, and the hospital staff co-designed and made site planning with the researchers. Architectural design was made by using paper model. Drawings were used as a tool for sharing ideas. Finally, the new hospital design was drafted and finished, but the community needed a budget to

construct the hospital. So, the hospital staff and the villagers organized some activities to find the funding for hospital construction.

Figure 41. Participatory design process with hospital staff
Source: Sayasevi (2011)

After receiving his Master's Degree, Mek Sayasewi, the researcher of this project, continued to do the project in co-creating hospital design in the name of CROSSs. The hospitals that used the concept and processes of co-creation include Benchalak Chaloem Phrakiat Hospital in Sisaket Province, and Phanom Dong Rak Hospital in Surin Province.

4.7 Summary of co-creation lessons from the case studies

These case studies confirm that the co-creation of value is essential in the success of development projects. Socio-economic settings might be different in each project, but the most important thing is to share and work together realizing the mutual responsibility for community development.

The economic system is the mechanism to drive the project to sustainability. In the Chanthaboon community, they use social enterprise concept for community funding and as the strategy to bring the villagers to participate in the project as well. Ban Pred Nai and Baan Mun Khong Housing Project use the savings group and community funding as the tool for involving the villagers to participate in the development. Pru Nai hospital also needed the money for construction, so the villagers and hospital staff organized activities for financing this. Therefore, we may conclude that the economic aspect important to gather people in the co-creation, maintaining and managing built environment as well as fostering social cohesion and environmental sustainability in the community.

It should be noted that ideas and concepts of development came from the community itself, with the suggestions from the researchers. Therefore, the role of the researchers in co-creation processes has been changed from project leader to moderator or facilitator.

Table 12. Summary of important issues from the case studies

Cases	**Chanthaboon community**	**Ban Pred Nai community**	**Baan Mun Khong Housing Project**	**Pru Nai hospital**
Social innovation	Social enterprise	Community engagement in mangrove forest conservation	Community engagement in housing development	Community-based hospital
Economics	Community right as the business shareholders	Savings group, social welfare	Savings group with funding support from CODI	Funding from inside and outside community for hospital construction budget
Environment	Luang Rajamaitri Boutique hotel, community learning center	Tire cubes for shoreline protection, mangrove forest conservation	Housing for the urban poor (slum upgrading)	Community hospital building and planning
Researchers	Arsom Silp Institute of Arts	RECOFTC	CODI, Arsom Silp Institute, of Arts (different research team)	Thammasat University
Concept of development	Arsom Silp Institute of Arts & Community leaders	Community leaders	Community leaders & villagers	Doctor & researchers

Cases	Chanthaboon community	Ban Pred Nai community	Baan Mun Khong Housing Project	Pru Nai hospital
Budget	Funding by selling shares	- Community fund & savings group - Tire donated from private company	Community organization uses savings group for the initial fund with loan from financial institute and CODI	- Government - Funding by selling products & events

CHAPTER 5
A CASE STUDY OF BAN MOH

A case study of Ban Moh in Maha Sarakham Province is the main study area of this dissertation. This chapter depicts the housing development carried out in the year 2005-2006 and compare it to the present situation. The data collected are from desk review, field survey, group discussion, and the individual interviews with stakeholders, including the project coordinator, the researcher team, the community leaders, the community committee members, the renovated household members, and the members of households that were not involved in the project. Moreover, this chapter analyzes the related case studies for better understanding by the documentary review, observation, and interviews with the experts in some cases as well.

5.1 The study area

Ban Moh is a village located in Khwao Subdistrict, Mueang District, Maha Sarakham Province, which is a distance from the city of Maha Sarakham heading to Roi Et Province. It is a small village with a population of around two hundred households. The people have their own dialect, distinctive culture, and way of life, including pottery making which has been handed down for many generations.

Most villagers engage in rice farming, and do wage labor as secondary occupation. As for pottery, around one-tenth families in the community continue to do pottery jobs to earn income. Many families have abandoned this craft due to aging. Younger

generations in the community, start to lose their interest in doing pottery. Working-age people tend to move to the city to find work like industrial workers and jobs in various service businesses.

Mr.Sudsakorn Chaiyot, Assistant Village Headman, described the history of Ban Moh village,

> About two hundred years ago, the ancestors of Ban Moh villagers migrated from Non Sung District, Korat (Nakhon Ratchasima) to this area, then they suggested the area to the other families in many districts of Korat, such as Phimai District, Non Sung District, Bua Yai District, Non Thai District, and Muang District. These people then settled in the area near Nong Loeng Ben lake because the clay in Nong Loeng Ben lake can be used as a raw material for pottery.

Most villagers in Ban Moh use Korat language, and they have inherited this pottery making craft. The villagers still row the boat in the lake and dive into the water todig the soil in the lake up to make pots. This is what the ancestors did in the pastin Nong Loeng Ben lake, now the villagers have to dive deeper so it becomes harder to dig for the soil.

Figure 42. Author interviews with Mr.Sudsakorn Chaiyot at Ban Moh
Source: photograph by Benjarat Prompen

Most pots are sold for use as a part of various rituals of the Isan people such as housewarming rituals and funeral rituals. These beliefs and rituals are still important for general villagers, therefore, the villagers who have pottery occupation can continue this to earn their income. Nowadays, there are new generations who inherit traditional production methods and at the same time, try to create a new design of the pottery as well.

5.2 Ban Moh rural housing study and development project.

In order to understand the co-creation concept used in Ban Moh housing renovation and development, there is a need to review the project. Such action research project started in 2005 with the funding from the National Housing Authority (NHA). The main objective was to find out the solution to improve the dwelling of the rural

community. The research team was from the Faculty of Architecture, Urban Design and Creative Arts, Mahasarakham University. The team consisted of the lecturers from different design programs and the students from Urban Design program. The researchers selected Ban Moh community as the pilot project of the North-eastern region because of the unique character of the village where villagers were migrants from Korat who have traditional pottery occupation.

The research team started this project with public hearing meeting and brain-storming with the villagers. Then they collected the data through surveys and interviews with the community members. After that, they did the database by developing a Geographic Information System (GIS) and base maps of the village. The researchers suggested the villagers to do self-survey and presented the information in the public hearing meeting. The researchers found that the most crucial problem in Ban Moh community was the inappropriate environment in the community especially the problem of waterlogging due to inadequate drainage of wastewater (Faculty of Architecture Urban Design and Creative Arts. MSU, 2005).

Villagers did not have the shared space in the community area nor the community center, playground, pottery-making center, the storage area, the proper pot firing area. etc. Furthermore, around 30 percent of the houses in the village were in terrible condition. Some households faced a landlocked house problem because the land was not connected to the road (Wibulswasdi, 2006).

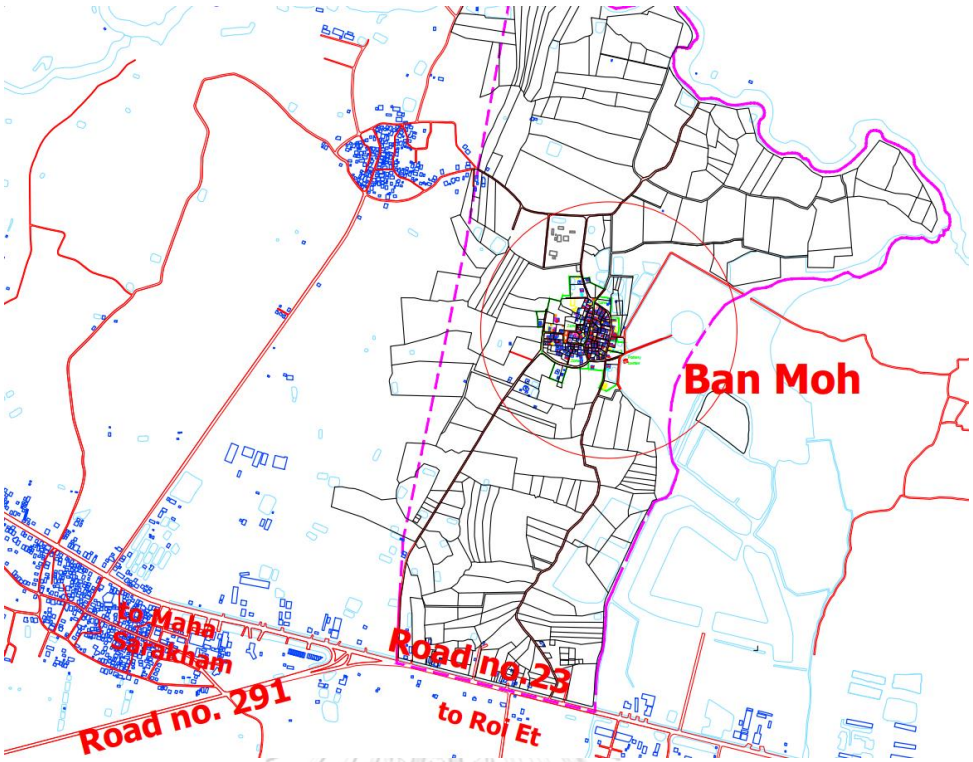

Figure 43. Location of Ban Moh from road no.23 Maha Sarakham-Roi Et
Source: adapted from Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

Figure 44. Ban Moh village gate in 2019
Source: Author

5.2.1 Phases of the development project

The Ban Moh research project consists of two phases as follow:

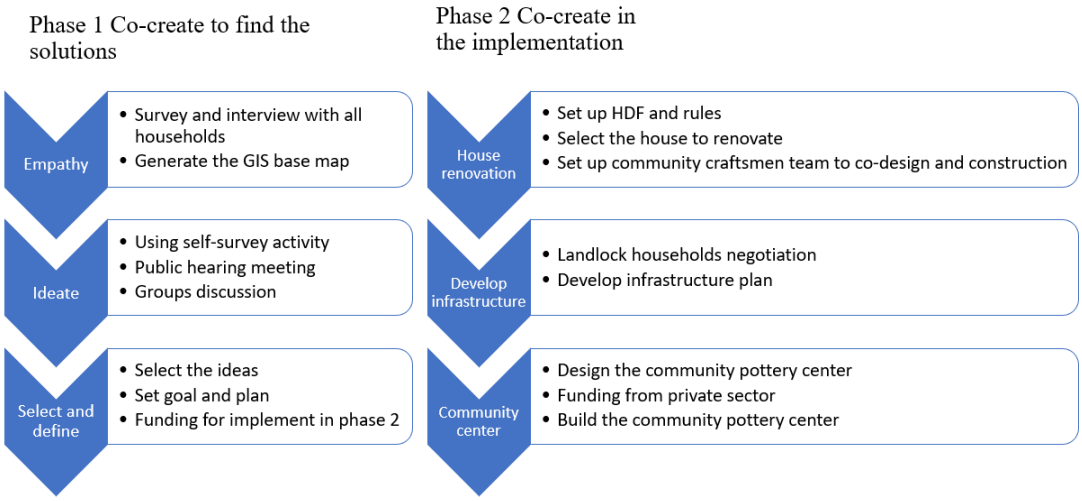

Figure 45. Phases of the development project

Phase 1. Ban Moh rural housing study and development project started in 2005. The researchers suggested the villagers to involve in the development project by self-survey and workshops, then the researchers began a community survey for doing the village maps. After the public hearing meetings, the researchers and community members agreed to solve the physical conditions of built environment problem of the community including;

1. To design the plan for improving infrastructures, including drainage and sewage system, lighting system, and water supply system for the sub-district administration organization to be used in the implementation.

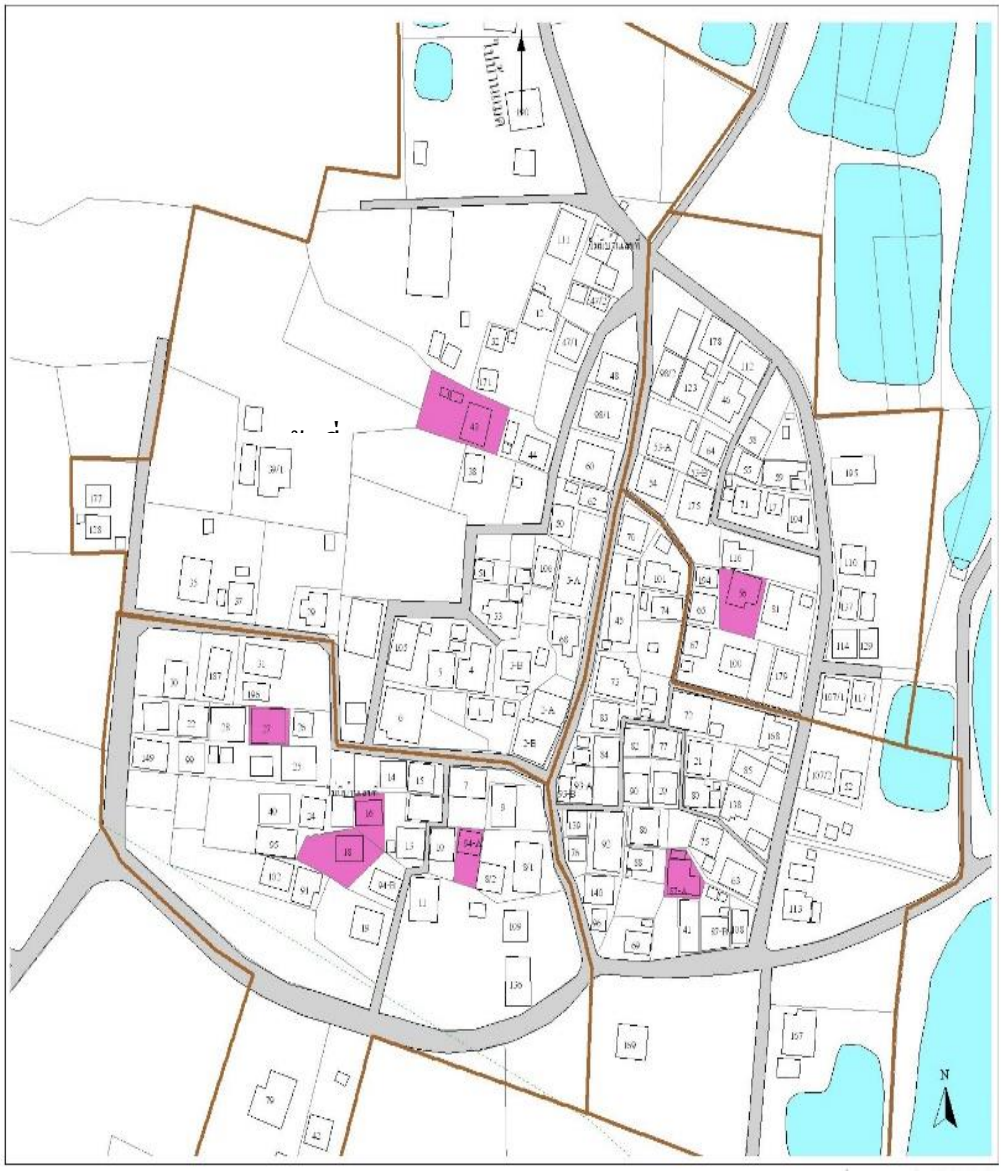

Figure 46. The landlocked houses location in Ban Moh
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

2. To make a new design to solve landlocked site for some houses by negotiating with the neighbors to exchange the land area for the pathway to connect to the road.
3. To design and build the community pottery center for working and storing the pottery in the process of work.
4. To do the house improvement.

To summarize, the activities in the first phase were to understand the problems and requirements of the community. The researchers, both lecturers and urban design students, collected data on every house in the neighborhood by interviews, surveys, and mapping activities. They used public hearing meetings as the platform to communicate and ideate by brain-storming with all stakeholders, including local government, village headman, village committee members, villagers, and researchers from various fields of design. However, in phase 1, not all the solutions were implemented. The researchers continued this development project by the funding from NHA in the second phase.

Figure 47. Public hearing during development project in 2005-2006
Source: photograph from the researcher team

Phase 2. Ban Moh rural housing study and development project 2006

The researchers collected data and requirements about the operation in the first phase. In this second phase, the researchers and the community, including village headman, village committee members, and villagers were well-acquainted with one another. After receiving the development funding from NHA, they continued the project by having 4 sub-projects as follow;

1. Infrastructure development -- they improved the drainage and sewage system, and they helped negotiating with the surrounding neighbors to find the solution for landlocked houses.
2. Finding more funding -- they asked for donation from construction materials supplier firm (Siam Cement Group or SCG) to cover for the design and construction of the community pottery center.
3. Designing and finding venue for new products -- the research staff from the Creative Design Department designed and developed new pottery products for the community. Moreover, the faculty also developed small pottery showroom in front of the Faculty of Architecture, Urban Design and Creative Arts building to promote and sell pottery products from Ban Moh community.

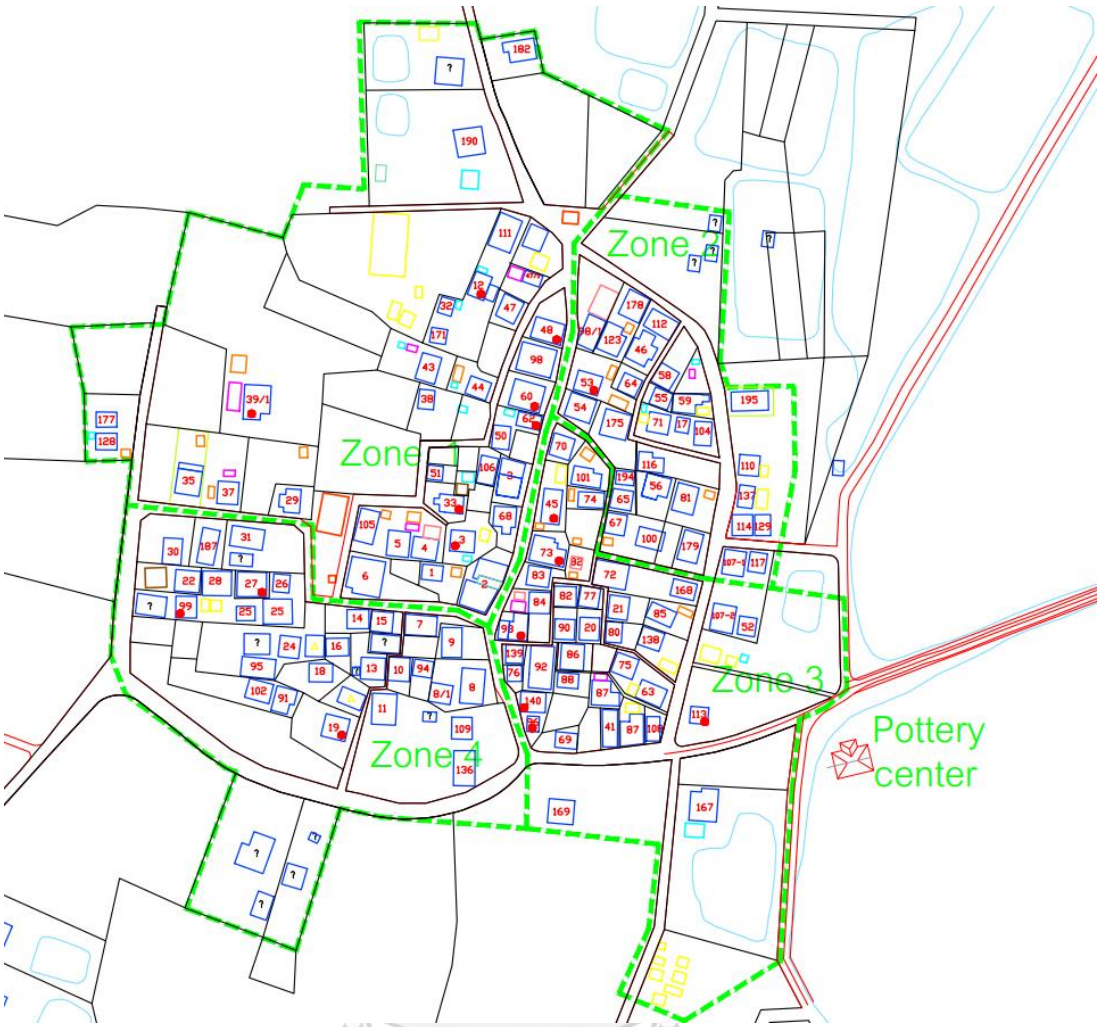

Figure 48. Zones of housing in Ban Moh
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006) adapted by author

4. Setting up House Development Fund (HDF) – The researchers and the community developed house improvement plan (or self-reliance renovation) by setting the criteria for selecting the appropriate houses. Then House Development Fund (HDF) was established for the project operation.

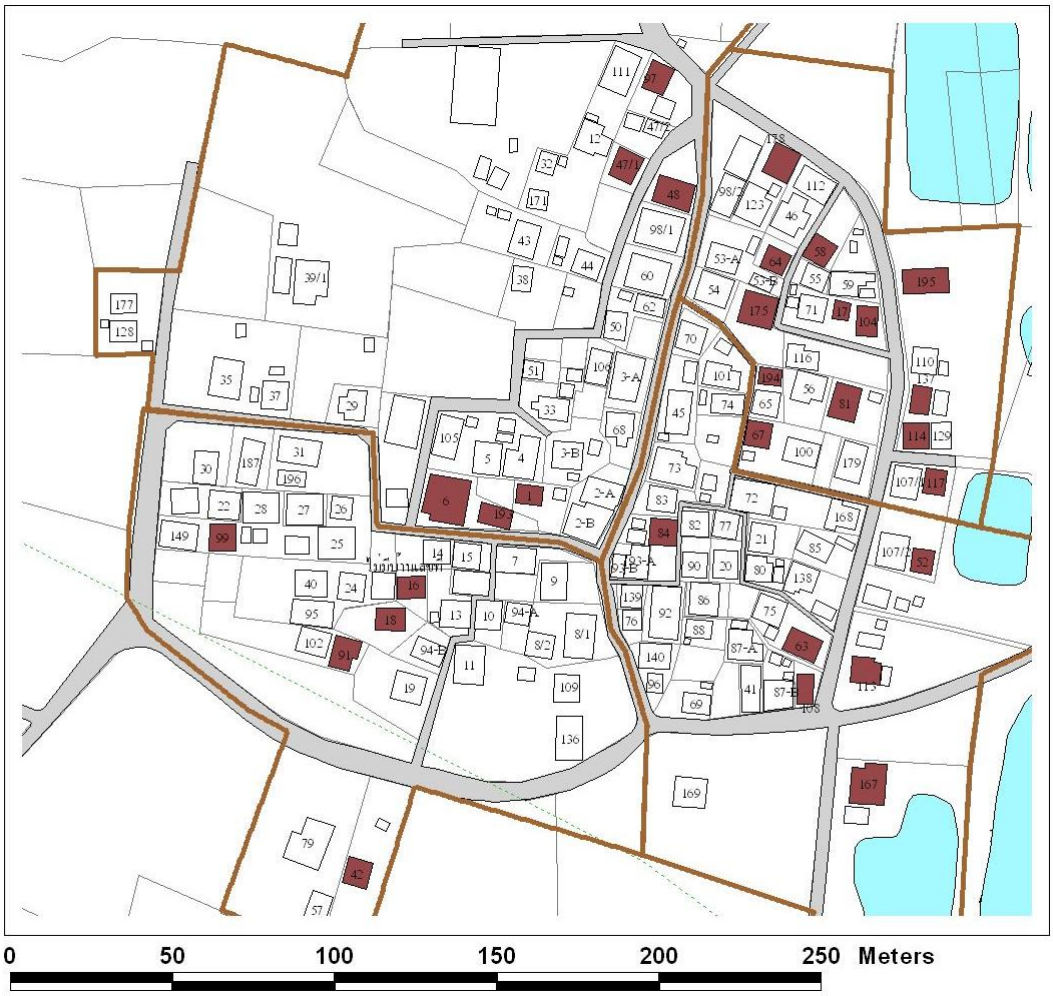

Figure 49. Location of 30 renovated houses in the first phase.
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

Figure 50. Outdoor space for pottery firing process near the community pottery center in 2019
Source: Author

Figure 51. The community pottery center still in use in 2019
Source: Author

Figure 52. Clay mixing process inside the community pottery center
Source: Author

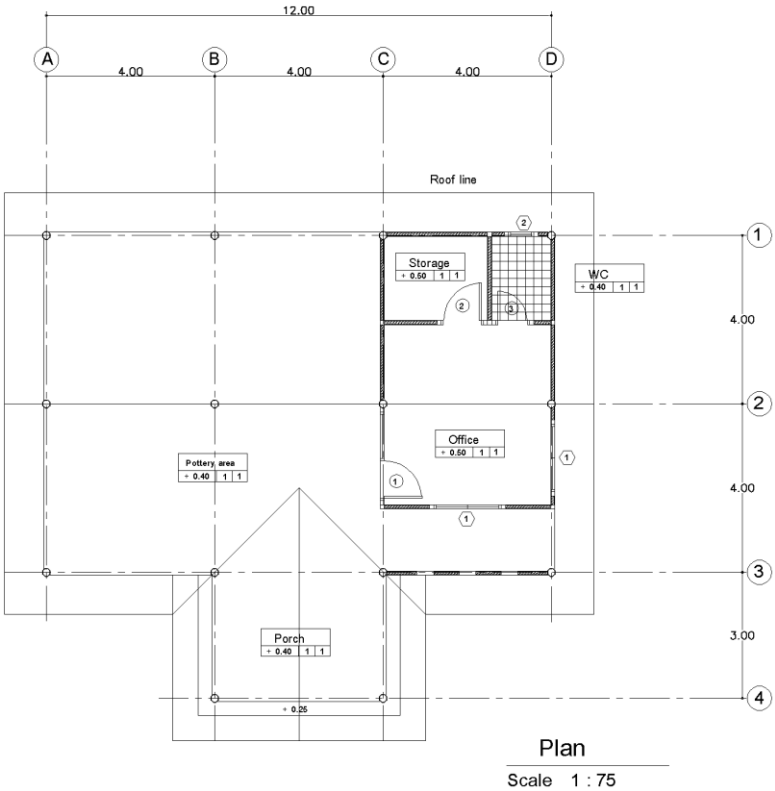

Figure 53. Community pottery center floor plan in 2006
Source: Research team, edited by author

Figure 54. Author interviews with a house owner, Mrs.Ranjuan Wangsiwklang
Source: photograph by Benjarat Prompen

Figure 55. House no.137 before and after renovation in 2006
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

Figure 56. House no.137 in year 2019
Source: photograph by Benjarat Prompen

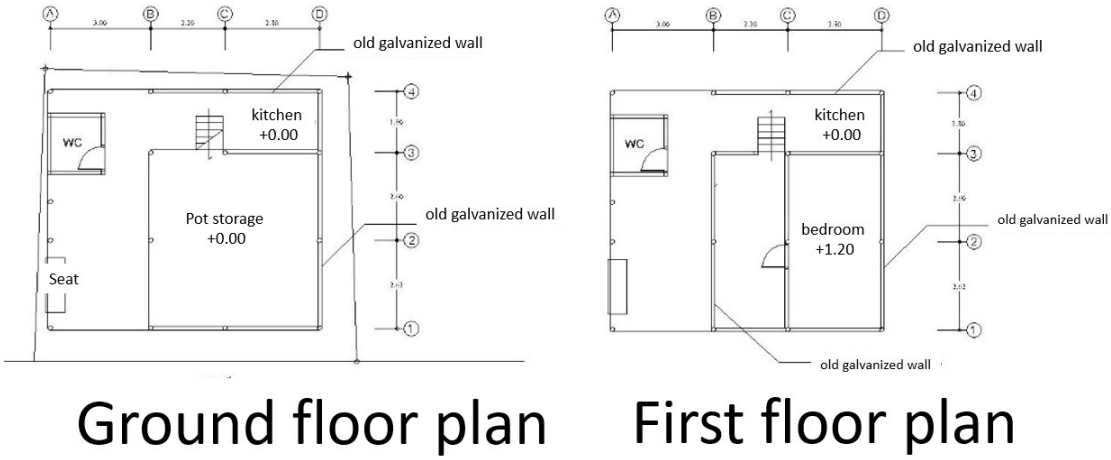

Figure 57. House no.137 plan for renovation in 2006 (build new house using some old materials)
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

5.2.2 Development activities in the research project

The central concept that was applied in the operation of the development project (2005-2006) is Participatory Action Research. The researchers took the role of a project leader in order to drive the whole development process. Therefore, the level of participation in the first phase was very low. The researchers started from the survey and did the maps to understand the physical conditions of the village. They held public hearing meetings with the community members to hear the problems and the requirements and made the program for developing in phase 1.

Table 13. The house condition from the survey in 2005
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

Condition	House	Percentage
Excellent	7	5.1
Good	37	27
Moderate	53	38.7
Bad	31	22.6
Terrible	9	6.6
Total	**137**	**100**

Figure 58. Base map colored by house condition
Source: Faculty of Architecture Urban Design and Creative Arts. MSU (2006)

5.2.3 Guideline development for house improvement

- The participatory process with surveys and interviews of 140 households
- Survey the needs of people in the community.
- Create a sequence plan for development.
- Create community plans for people in the community
- Survey housing conditions, problems, and needs from the villagers

From the surveys and interviews, there are 40 houses in need of repair. However, only 32 house owners really applied for improvement. Eventually 30 out of 32 houses were selected for the renovation process. These are the ones that met the criteria of the ability to return the loan payment.

5.2.4 Guideline development for landlocked households in the settlement through negotiation with the neighbor

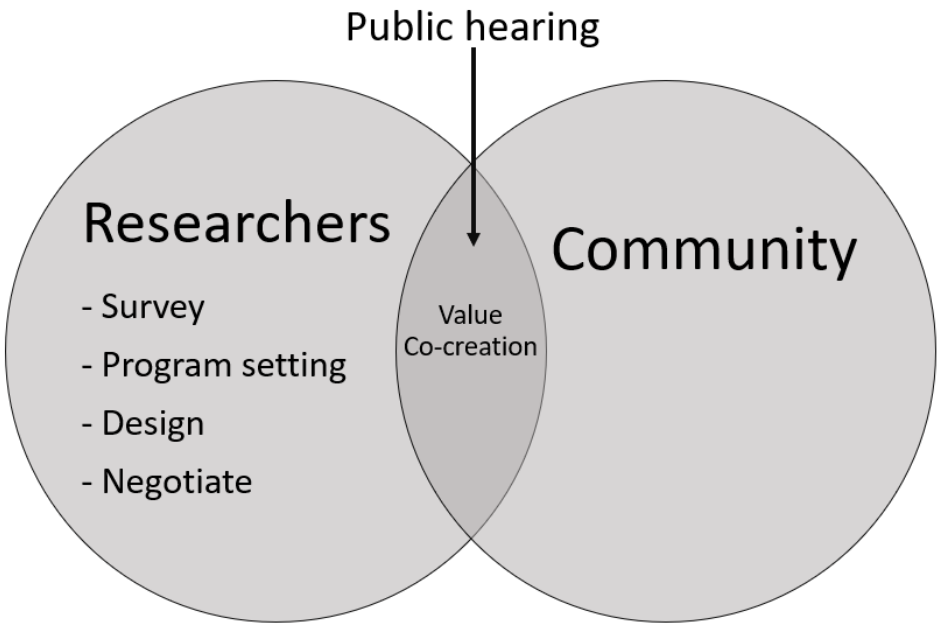

Figure 59. Study the problems of the community, then set the program by informing and consulting with the community through public hearings in phase 1
Source: Adapted from the joint space of creation (Koning et al., 2016, p. 270) by the author.

In the second phase, they developed the village infrastructure, such as the drainage system, and they solved landlocked problems for some houses. Besides, the community pottery center was co-designed and built for doing pottery and storage.

After phase 1, the researchers and the community started to understand one another and to co-create value together for setting the goal of developments at the end of the first phase. National Housing Authority (NHA) continued to offer research fund for developing the houses in the community in step 2. Therefore, they raised the participation level by the co-creation of value and setting the goal and planning together.

Phase 2 was developed in the year 2006. The researchers and community used the participatory process to make an agreement in the house improvement activities as follow:

- Develop guidelines for house improvement
- Set up the Housing Development Fund (HDF) led by the researchers, the village head and village leaders. Then HDF set the rules for the project operation.
- HDF recruited house improvement participants. HDF considered and selected the houses for improvement/development by the criteria of house conditions including the financial ability of the house owners to pay installment back to HDF. They improved the selected 30 houses by the self-relied process.

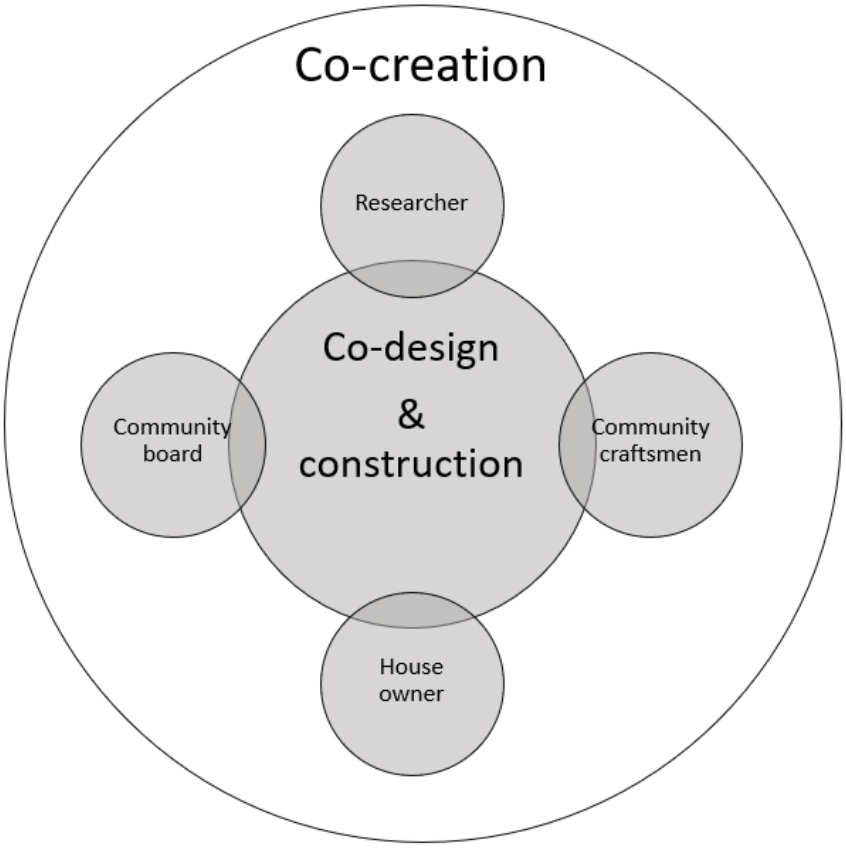

Figure 60. Co-creation in house improvement (self-reliance renovation) in phase 2
Source: developed by the author

In phase 2, they set up the community craftsmen to assist both researchers and the house owners in the process of a design decision in the actual location and choosing materials from the store. The community craftsmen were identified from the members of the community who have experiences in the construction of built environment. The were 4-5 groups of community craftsmen and each group consisted of 3-4 persons. They consulted with the house owners on the construction process and cost control. However, construction cost estimation was done by the researchers in the house selection process together with the community committee, so there was a high level of participation in decision making.

5.2.5 The working process of community craftsmen team

From the interviews, the researchers explained the process of setting up community craftsmen teams as follow

1. Identify craftsmen and construction workers in the village and the nearby community by skills and past work records.

2. Start the construction of the community pottery center, and group craftsmen and construction workers in teams.

3. Assess the quality of construction, analyze work patterns and skill levels of each group to prepare for house renovation project.

4. The craftsmen groups helped the community for house improvement and construction process as follow:

- Teams of craftsmen and house owners worked together on house renovation and cost estimation, including the price and amount of materials needed in this process, the house owners selected the craftsmen team and agreed on labor cost after a consultation with the research team.

- Craftsmen team co-worked with the house owners and jointly ordered construction materials at the store, then they carried out construction work together.

- Each team of craftsmen was responsible for constructing several houses. Therefore, the community leaders acted as the consultant who are also responsible for the construction.

Recruiting craftsmen teams from the community and nearby area brought good results in the implementation of rural housing projects. These people are already familiar with such a form of construction. It made the construction process faster, cheaper, and more responding to the needs of house owners.

The result of the operation led to greater cooperation in many parts of the community. Each part had the opportunity to play its role fully. It is another essential goal of making the community more cooperative and stronger for carrying out other activities that will occur in the community development in the future.

5.3 The process of the development

In a case study of Ban Moh, the development process consists of two phases that are different in the steps of operation, the roles of stakeholders, and the participatory methods. In the first phase, the researchers started to understand the community by interviewing every house and surveying infrastructure in the village. Then GIS database and base maps were developed. The community members did the self-assessment in the public meetings for co-creating value and targets of the development together. This process was led and observed by the researchers, while the users' needs were the subject matters of the study.

All stakeholders, including the researchers from various fields of design, village committees, and household's representatives shared their views in the workshop. Then the researchers selected the essential ideas to develop an improvement plan to implement in phase 2.

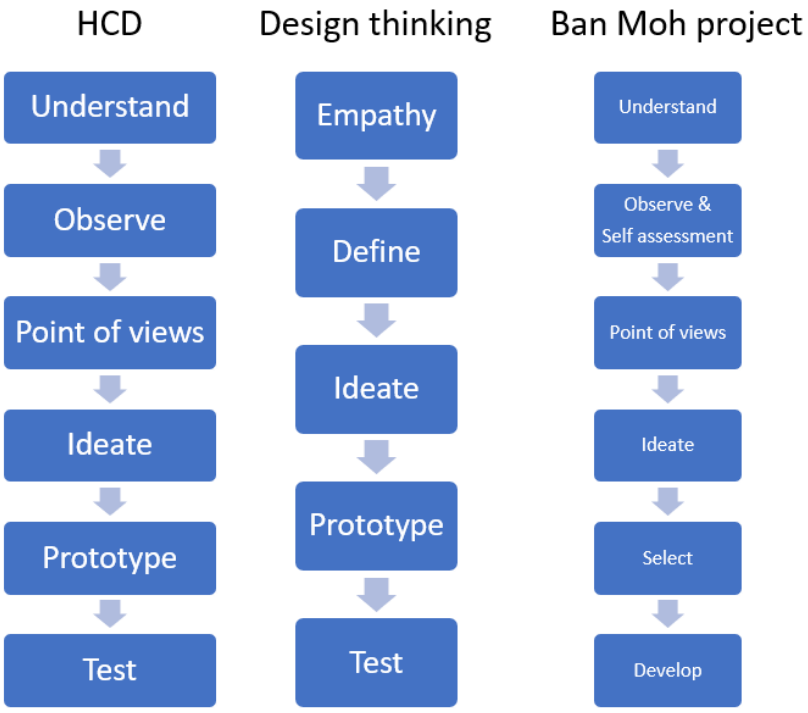

Figure 61. Comparison of steps in Human-Centered Design (HCD), Design Thinking, and the practices in Ban Moh project
Source: adapted from IDEO.org (2018) and d.school

Therefore, the first phase of Ban Moh project focused on human-centered design concept whereby the researchers aimed to improve the users' experience of the built environment of the villagers, but they did not include the villagers in the design selection process. At the end of the first phase, the researchers only informed and listened to the villagers in the public meetings.

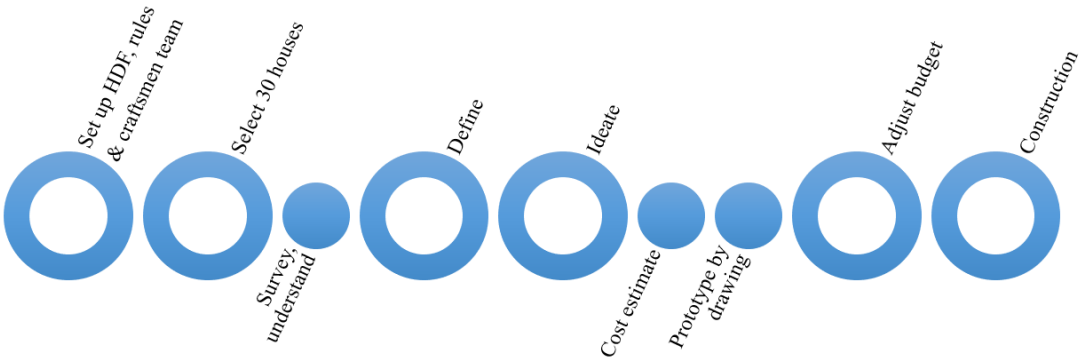

Figure 62. Processes in house renovation
Source: Author

*dot = steps by the researchers; circle = steps in co-creation

In phase 2, the processes in house renovation were different from the first phase. The researchers changed their role from the project leader to the project organizer instead. The researchers collaborated with the village committee to setup HDF and community craftsmen teams. Then the HDF became the project committee for operating the project. The HDF selected 30 houses from 32 houses that have applied for house improvement.

The researchers surveyed the condition of the houses and studied the requirements of the house members in each house. The house owners co-designed their houses with the researchers that took the role of the designer. They defined the area of the house to be renovated.

The community craftsmen acted in the construction materials selection and budget control. This process is the main co-creation activity among the HDF where the researchers, the house owners, and construction material shop owners in the operation

process. The researchers played roles as the designer, the facilitator, and the negotiator in the process. The craftsmen played roles as the translator and the technician in materials selection and construction. The HDF acted as the decision panel to organize the renovation. The construction material shop owners also helped to control the material used in this project.

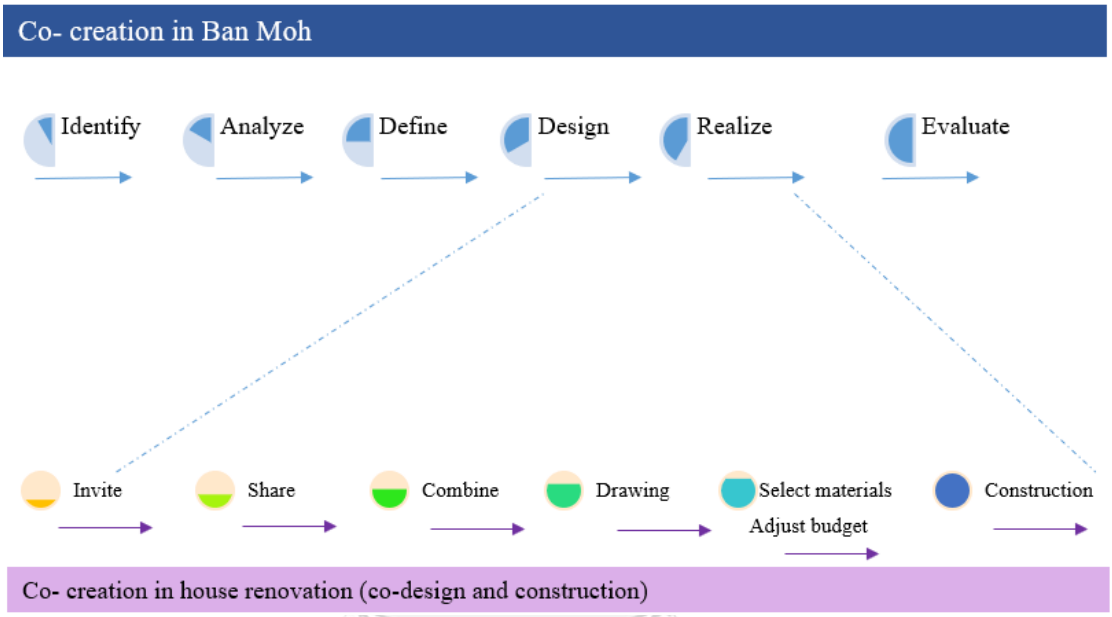

Figure 63. Processes in the house renovation and development in Ban Moh
Source: Adapted from Koning et al. (2016) by author

Co-creating built environment in Ban Moh in 2005-2006 consists of co-creation in the overall development and co-creation in house renovation. The main idea of Ban Moh project is housing development because this project is the pilot project to find out solutions for rural house development in the North-eastern region. However, the researchers in Ban Moh project initiated the project from identifying the problems with the villagers, analyzing data from surveys for defining the direction of the

development project. Therefore, the processes from the identified process to the defined process were operated in phase 1.

The co-creation in house renovation includes:

- Invite all stakeholders to co-create
- Share ideas, problems, needs, knowledge, experience, and limitation
- Combine ideas for design solution
- Draft the construction drawing
- Make joint decision in material selection
- Contribute in construction work

After finishing house renovation/construction, the researchers together with HDF committee summarized the project in the meeting. However, there were problems with the non-returned debt to the HDF, and finally, they agreed to terminate the project.

5.4 Levels of participation

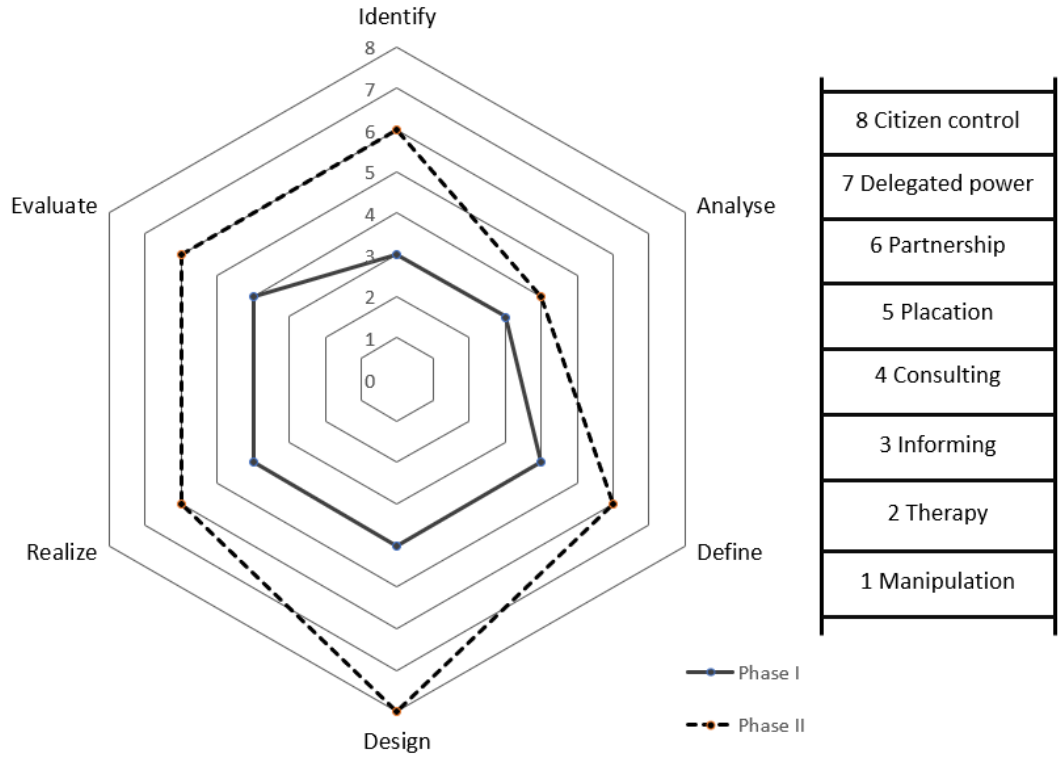

Figure 64. Levels of community participation in each phase of research
Source: Adapted from Arnstein's ladder of participation by the author (Arnstein, 1969, p. 217)

From the research report and interviews, it was found that

In the first phase, the researchers worked in the village with the community leaders and interviewed all of the house owners. However, this was for understanding the needs and requirements of the community, so, the participation level was in the 3rd rung (informing) of Arnstein's ladder (in the identify and analysis process). Then the participation level became higher in the define, design, realize and evaluate steps by the public hearing method.

In the second phase, the participation level was elevated to level 6 due to the partnership from the establishment of HDF and community craftsmen teams as the

partners to co-create with the selected house owners in the renovation. In the design phase, the participation level became the highest because the house owners designed the house by themselves with suggestions on technical aspects (like structure and construction details) from the professionals. The project was then evaluated by the house owners after the renovation was completed.

Co-creation is like creating the neuron network that the creature needs in order to function the whole body. Co-creation can connect the small groups or parts to think and do together, to synergize and bring creativity for the different solutions. However, co-creation is mostly emphasized on thinking rather than doing, but participation in the implementation is a must. The outcome of co-creation includes values, ideas, plans, activities, projects, and most important is long-term relationship that will carry through during the project development, implementation, or even after.

On the other hand, co-creating built environment usually emphasized on the co-design and in some cases, the implementation, construction and renovation. Co-creating built environment needs higher levels of participation in order to meet the satisfaction of all stakeholders. The prototype of the co-designed project cannot be tested on the real site because it takes time and cost to build. However, many projects use the drawing and model to simulate the prototype for a clear understanding with all stakeholders and participants.

Co-creating built environment has more influence on the output than co-creation as an innovative approach because the product of the co-design or co-creating built environment is tangible.

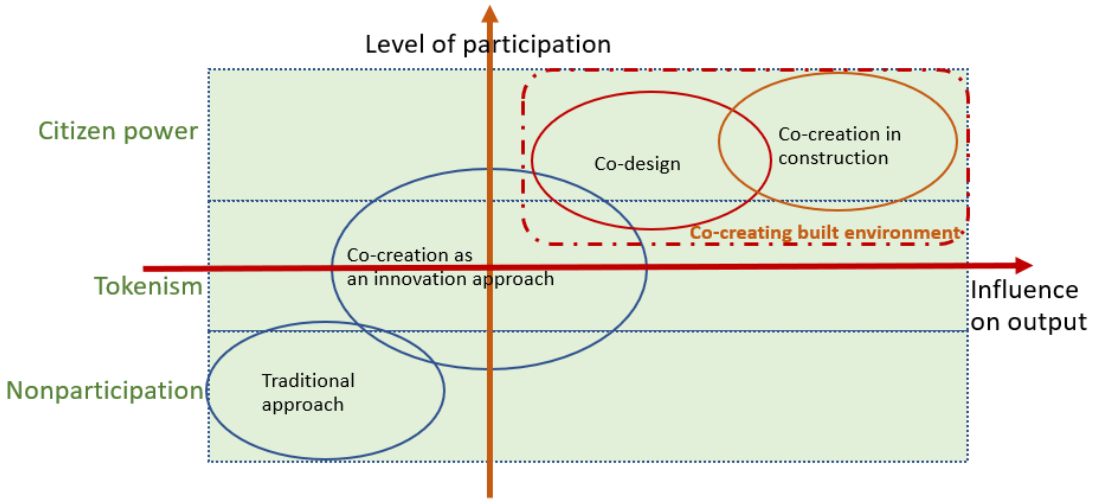

Figure 65. Co-creation in the different participation levels
Source: developed from Koning et al. (2016) and Arnstein (1969) by author

The case of Ban Moh goes beyond co-design because it moves up to the stage of co-creation in construction that requires collaboration between the community craftsmen, the house owners, HDF, community committee, construction materials shop, the designer, and the researchers. So, the process of co-creation in design and construction improves the knowledge and skills of the participants, particularly the house owners, through interaction and exchange of ideas. Throughout the project implementation, the house owners have increased their skills in maintaining and improving their houses. Furthermore, after the development of co-creation network, some house owners can still use these craftsmen in their house improvement despite the termination of the project.

The result from the site survey and the interviews, affirms that many of houses are improved even after the renovation project in 2006. The physical condition of the whole community is also better than in 2006.

Co-creation in the built environment design and construction increases the value and happiness of the users and the neighbors. It creates a better environment and solves problems by developing from shared ideas. Although it usually takes more time in the planning and decision process, it is worth taking time to select an option that everyone is happy rather than to create an unwanted output like in a traditional approach.

5.5 Co-creation roles

Professional roles for enabling partnerships (Eggertsen Teder, 2018) found in the case study are as follow:

1. Professional role as the curator– connecting people and opportunities
2. Professional role as the meta-designer – preparing for (re)design-in-use
3. Professional role as the facilitator – providing/teaching design tools
4. Professional role as the negotiator – addressing conflict

The roles that are mostly found in the Ban Moh case study are the curator, the meta-designer, and the negotiator, while the facilitator role is the least apparent in the process of design. The researchers played a role of professional designer to do the design drawing and model instead of introducing the generative design tools for the participants. Still, the researchers continued to lead the project in the name of HDF both in construction and the debt collection procedure.

Co-working with the community craftsmen enabled the house owners to present their ideas and needs to be applied in the design process. Some house owners said in the interview that they did design their own house by themselves. Then they communicated with the community craftsmen and the researchers by conversation and by making a rough design on-site. Then, the researchers did the draft design to confirm their understanding and to be used in the cost estimation and construction as well.

When the house owners joined the craftsmen to repair the houses, they learned various construction skills. So, the house owners gain more knowledge and expertise in construction from this project as well.

Table 14. Comparison between two phases of development

Factors of the development	**Phase 1**	**Phase 2**
User / owner	Community	Private houses
Stakeholders	Researchers, village committee, SAO, villagers	HDF, house owners, craftsmen, material shop, researchers as the designer and cost-estimator
Participation level	Low-level	High-level
Participatory techniques	Self-assessment Public hearing workshop Interview House survey	Group discussion in the real location (working as a workshop) Construction drawing Construction tools

Factors of the development	Phase 1	Phase 2
Loan funding	Research fund from NHA	Research fund from NHA With supported by the house owners
Financial mechanism	Not develop	HDF lend the materials and collect the debt by installments
Outcomes	GIS base maps Co-creating value Development plan	Construction drawing The renovated houses
Network of learning	None	Exchange ideas and practice between each house

5.6 Sustainability

5.6.1 Problems after the development

After the house improvement had finished, almost all parties were satisfied with the house improvement. The house owners were happy with the new house that fit their needs, and they took part in every step. The researchers could finish the project in time, and community craftsmen received the earnings and went on to work in other sites.

However, the HDF collected installments from the first 30 houses for circulating to improve other houses in the community as in the project goal to develop all houses in Ban Moh. The problem had occurred after several months of the debt collection process as followed.

1. Some house owners borrowed the construction materials to renovate their houses but did not pay the money back to the HDF, and the HDF could not collect the debt.

2. When some house owners had not paid the installment back, the other house owners refused to pay too.

3. The HDF could not circulate the returned money to develop the other houses in the community as the former plan.

4. Finally, the researchers helped the HDF to summarize and closed the project account, and also closed the HDF as well.

However, this project is successful in terms of built environment and in terms of upgrading quality of life in the community. The infrastructure like community center is well-maintained by local organizations and villagers as follows.

- The infrastructure, drainage system, and road had been developed to follow the design guideline of the project. Moreover, the local organization and village committee work in maintenance and improvement. The condition of this infrastructure is better than at the end of the project in 2006.
- Nong Loueng Ben lake has been dug to get rid of wastewater and unwanted water plants. The environment is better, but it makes a little harder to take the clay from the lake to do pottery.
- The community pottery center is still in use and well-maintained by villagers
- The renovated houses are in good condition and well-maintained by the house owners; some houses used the same old craftsman from the craftsmen team in construction. This confirms that the co-creation in the house renovation

expands the continuous result. The co-created network still remains after the co-creation project has passed.

On the contrary, no one loses benefits at the end of the development project, except the unselected house owners that the project closed before to improve their house. But the project has failed in the sustainability in economy aspect and particularly in the social aspect. The co-created value of the community had been reduced because of the villagers do not trust in the credit of other members anymore. Moreover, some community members understand that researchers come to do research projects to help them so they do not have to pay back.

Moreover, the failure of the Ban Moh project also affected the entire social system beyond the Ban Moh community because the Ban Moh project was the pilot project in rural dwelling development in the North-east region. Therefore, the opportunity of other villages to develop had been destroyed by stopping this project. The result of the Ban Moh project could not meet the aims of the research grant (NHA). So, it needed to improve for protecting public benefits.

5.6.2 The key issues to improve

The key issues to improve are including

1) The financial enforcement. Although the HDF has the rules and a loan agreement under the law, but it did not act in implementation.
2) The financial mechanism. It needs to use the cooperative or the saving group in debt collecting rather than collected by the researchers, because the social welfare can guarantee the risk of NPL (Non-Performing Loan).

3) Inclusive development. Because the stakeholders in the development is including inside and outside of the community, therefore it needs to include the stakeholders from outside of the community and from the unselected homeowners in the village in co-creating built environment as well.

After this project closed in 2006, Ban Moh is more popular and well-known from the public. Many pieces of research and development projects from different organizations come to the village. From the interview, the villagers are waiting for the new development projects for their benefit without strengthening the community themselves. However, it has efforts from some community members to develop a community museum and learning center located in the temple of the village.

5.6.3 The mistakes and lessons

From the interview, it was found that the researcher played the role as the leader of the development project more than the role as project coordinator, because of the short time limitation and the large number of tasks to handle in the development project. However, the failure is not caused by the researcher role only, but from different parts, including the researchers, the village head, the house owners, and particularly the processes of the participation.

According to suggested public participation guidelines by Bryson et al. (2013), the important guidelines that had not been applied in Ban Moh are

- Guideline 4. Work with stakeholders to establish the legitimacy of the process

- Guideline 5. Foster effective leadership
- Guideline 7. Create appropriate rules and structures to guide the process
- Guideline 8. Use inclusive processes to engage diversity productively
- Guideline 9. Manage power dynamics
- Guideline 11. Develop and use evaluation measures

In the 4th guideline, to work with stakeholders to establish the legitimacy of the process and the 7th guideline to create appropriate rules and structures to guide the process. In Ban Moh, although they agreed to establish the HDF, but the researchers still lead in the project implementation, particularly in the debt collection task that hard to be collected by the researchers that lived outside the village. From the interview, one of the house owners told it would be possible to collect the debt if it handled by the community. It is necessary to use social systems and mechanisms such as cooperatives or savings groups to control the debt collection. The villagers refused to pay installment because they knew that the researcher would not sue them, and the debt did not affect their social welfare. In fact, the house owners that were not selected for the first time were not included in the development project after that time. This group is the most affected by the failure of debt collecting, so if the HDF develops with inclusive, it can be more effective in the implementation.

In the 5th guideline, to foster effective leadership and the 9th guideline to manage power dynamics. This is the weakness of the Ban Moh development project because the village head in that time had low-level administration. The village head cannot lead the villagers to participate in the development, and this project cannot improve the leadership of the village head. The researchers had to act as the leader of the

community in this project. This brought the project to unsustainability and failed after finished the construction process.

The 8th guideline (to use inclusive processes to engage diversity productively) is the big mistake of the Ban Moh project. Because after the HDF selected the participants in the house renovation, the unselected house owners had not included in the development process anymore. These families were the most affected group because they lost the opportunity to renovate their houses as the former project plan.

The 11th guideline to develop and use evaluation measures. It found, the evaluation process was done only during and finish the first phase in 2005, but not found in the second phase. The development had been scoped down to develop only selected houses without realized the opinion from others that directed the project to failure in the end.

In addition, the concept of co-creation changes the professional role in the development, from the project leader to the curator, the metadesigner, the negotiator, and the facilitator (Eggertsen Teder, 2018). But in Ban Moh project still use the paradigm of the researcher played a role as the leader of the project that comes to help for developed the poor rural village. This paradigm makes a big difference in the perceptions of the participants in the project. So, it affects the awareness of the participants. The villagers think they have received help, but they do not need to act and do not in charge of the development.

5.7 Problems and obstacles in the implementation of co-creation concept

According to the failure in the sustainability of the Ban Moh house improvement project, particularly in the economic and social aspects. This need to bring the professional from the financial and law sector to co-create in the process of development. Also, the community leaders of the success community like Baan Mun Khong should be invited to join in the project for exchanging knowledge, experience, and techniques in the development as well.

From an interview with the researchers, women are willing to join in the participation process like public hearing, while men are not interesting. So, this can improve by using other methods in the participation or co-creation like informal group discussion in the coffee shop.

The most critical variable for the sustainability of development is the strength of the community that came from the leadership of the community headman, community leaders, and their network. The social system needs to be strengthened by communication and participation in administration.

For economy sustainability, social welfare should be provided by using financial systems and mechanisms such as the saving group, cooperatives (like in the case of Ban Pred Nai and Baan Mun Khong), or social enterprise (like in the case of Chanthaboon riverfront community).

For social sustainability, it needs to co-create value inside the community without the interfered factor from the outside community. In the case of Ban Moh, although pottery is the most well-known for the public, only less than 10 percent of the

members are still doing the pottery. They need to include the other occupations in the community in value co-creation for developing in the inclusive direction.

Time limitation is the crucial obstacle of co-creation because it takes time in the process of work. But after they set the network, it will be much easier to divide tasks into small groups, and the collaborative working of members can implement each group.

5.8 The guidelines in co-create the built environment for sustainability

According to the result of the study, it found the lesson learned to develop to the guidelines in co-create the built environment for sustainability including

1. It needs to co-create the value by the community of the development project for setting the goals and the direction of the development together. The co-created value is the main concept of the project approved by everyone.

2. The useful tool for co-create value is the sharing of ideas from everyone. There are several techniques for sharing, such as a slogan contest, storytelling, exhibit the dream image drawings, photography exhibition, knowledge exchange meeting or workshop, the field trip to the other sites, group discussion, deep listening, funding event, etc.

3. The concept of the co-creating project is the result of value co-creation, so the designers do not need to find out the idea from their imagination, but they have to respect the intrinsic co-created value from the community.

4. The role of the researchers and the designers should change from the leader of the development to the organizer, the network connector, the facilitator, the metadesigner, the negotiator, the technical advisor, and the design developer for the implementation and construction. It can increase much more effective co-creating results.

5. The social system is essential for the sustainability of co-creation. The critical success factors are including

- Groups and network
- Leadership and working in a team
- Inclusive development
- Trust and transparency
- Relatives social
- The same culture, occupation, language, and beliefs
- Awareness of the members
- Learning and working network

6. The mechanism of co-creating built environment for sustainability is based on the financial system and social system, including the funding, saving, welfare, loan, rules, and enforcement.

7. Co-creation can improve the satisfaction, ownership, and the awareness of the participants. Not only co-creating value can shape the built environmental design, but the co-creating built environment is also developing the value as well.

8. It needs to enforce the co-creating rules by using social enforcement or law enforcement if needed.

9. It needs to include the whole stakeholders in the development particularly the affected stakeholders from both inside and outside of the community for protecting their opportunity and benefit.

10. Networks to exchange experience and knowledge are essential for building capacity of the development. It is usefully for improving the community development by sharing experiences and knowledge among the network.

These suggested guidelines can be applied for co-creating built environment development by concerning the different contexts in each project.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of the study

The objectives of this study are to understand the processes and practices of co-creating built environment in the context of Thailand through the description and analysis of cases. The results showed that in Thailand, the term is used with mixed meanings between participatory design, participatory action research, public participation, and co-creation without understanding the differences of these concepts. This study reviews the evolution of the concept from cooperative design through co-creation for understanding the origins and uses of each term. Co-creation is the most advanced in engaging users in the design process. Because co-creation is shifting the paradigm from designer/planner/researcher-centered to involving users/relevant stakeholders in the design process. It is different from the earlier concepts where users' needs are the subject matter of a research, then the designing or development process lies in the hand of designer/planner/researcher.

Therefore, the result of co-creation usually fits the real needs of the users. The co-creating outcomes can vary from product, innovation, idea, value, activity, knowledge technique, experience, strategy, plan, policy, etc. So, it is going far beyond the scope of design but to create anything, everyone could take part in the co-creation process.

The professional designer skills are also important in the co-creation process, particularly in co-design. The designer should act as a coach to suggest and provide the design tools such as making a model, sketch, sticky note. These design tools are

helpful for sharing ideas from everyone. After co-creation process, the designer should develop the selected ideas to the final design with professional skills.

The finding from the case studies include 1) The sustainability of the built environment project depends on the strength, mechanism, and social systems of the community. 2) Raising the right of the people in development and design brings satisfaction to the users of the built environment. 3) Co-creation is the process of connecting people together in the creation of new ideas and innovations, while the participatory process can bring them to the implementation. The key informants from the in-depth interviews also affirmed that community trust system is an essential key to lead to sustainability.

6.2 Recommendations

Co-creation of projects would become an excellent method to create a new network by bringing different people from the various group to be connected. According to the result, the recommendations are as followed

6.2.1 Recommendations for the community

Co-creation is a powerful method to bring ideas and needs from everyone to create the innovation of development. The community, the owners and users of the development projects comprise of different groups and networks from both inside and outside. It needs to include all groups and networks, particularly the persons affected by the development of the co-creation. The co-creation project should be driven by the

community by inviting other organizations, including the public sector, civil societies, NGOs, government agencies, professional designers, private companies, and the researchers, to engage in the development.

Co-creation takes time to create a network of thinking by bringing people from different groups and networks and opening an opportunity to connect and share. Once the connection has been created, this network can continue to develop in the long term. The outcomes from co-creation can be tangible and intangible. The intangible outcome is including values, goals, plans, strategy, activities, methods, knowledge, techniques, experiences, and ideas, etc. The tangible outcome may be innovations, products, or development projects that can be developed to the implementation with participatory by the co-creating network and the other networks of the members.

Co-creation can bring well-being to the community and improve the quality of life of the people in the development. Although there are many conflicts and disappointments in the operation process, but co-creation process can eliminate conflicts and dissatisfaction by negotiating concerning everyone's rights in the way of democracy.

6.2.2 Recommendations for the professional designers

The role of a professional designers should be changed from design for the users to co-design with the users. Even if the user has a role as a designer, but the professionalism of the designers is still important in the development of the design. The designer should suggest design tools such as a paper model or sketch that helpful

for sharing ideas by everyone. The designer should develop the preliminary ideas and needs of the user for developing the complete final design. This co-creation takes a shorter time than traditional design methods, in which designers have to do many alternative models for users to select and then develop into a final design. Furthermore, a co-design method can create more value and satisfaction for the users. They should be proud and satisfied with the design that was generated by themselves.

The professional skills needed in the co-design include aesthetics of design element, efficiently functional design, structural design, infrastructure and building systems design, environmental design, details design, materials selection, construction method design with time and cost-control.

6.2.3 Recommendations for the researchers

The researchers' role should be transforming from the project leader to the facilitator and the negotiator for connecting all stakeholders into the co-creation. The researcher mindset should be changing from the helper or the giver to the co-worker instead.

According to the case studies, it found most of the success cases are community-driven development. Therefore, the community should act as the main actor in the event, and the researcher should support the technical knowledge and techniques in co-creation.

In the case of Ban Moh, the researcher could suggest the community to develop a financial mechanism like a saving group before starting the house renovation. It would be more efficient and could manage the risk of non-performing loans.

6.2.4 Recommendations for the government agency

Referring to the right of the people and right of community as declared in the Constitution, the government policy should decentralize governance and administration to the community. The development policy should be changed from being formulated by the government agency to being co-created with the community. According to a case of the tire cubes in Ban Pred Nai that did not receive budget support from the government agency, but the budget is spent on an unwanted project like the bamboo barrier. In addition, the result from an interview with the leader of the Chanthaboon riverfront community also affirms that the budget from the government agency is not fit with the needs of the community. It can be concluded that a large amount of supported budget is spent in the wrong direction of development and led to unsustainability.

The government agency should listen to the community by engaging with the co-creation and bring the co-creating outputs for developing the policy. It would be improving more precise and efficient to respect the community right in the development. Because the community is not only the owner and user of the development, but the community would also take care and maintain for sustainability. The workflow of the development would be smoother and decrease conflicts because everyone is taking part in the co-creation.

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APPENDICES

APPENDIX A

In-depth interview question structure for the Ban Moh researcher team

Interview No. _____

Subject Co-creating built environment for sustainable development: a case study of Ban Moh, Mahasarakham Province

Remarks

1. This interview is a part of dissertation research of Assistant Professor Chainun Prompen, a doctoral candidate in the Environment, Development and Sustainability program at Chulalongkorn University.

2. The purpose of this interview is to understand the processes and practices in co-creating built environment for sustainable development as appeared in a case study of Ban Moh, Mahasarakham Province.

3. An interview consists of two sections including general information and in-depth question towards co- creating built environment for sustainable development.

The results of the interview will be used to analyze in this dissertation only. All personal data provided will be strictly kept as confidential.

Your cooperation in this research is highly appreciated.

Part 1 General information

Name _____

Position in the research project _____

Job responsibility _____

Partner and team _____

Time spent during the project _____

Sequence of your tasks

1) _____

2) _____

3) _____

4) _____

5) _____

Part 2 In-depth question towards co- creating built environment for sustainable development

How does the project develop?

Why did you take part in the project?

How about the working processes and practices of the project?

1) background of the project

2) the initial process of select the community, and the development

3) the preliminary study stages

4) the public participation processes

5) activities in the project

6) tools using in the project

7) how to communicate with others?

8) network and groups in the development

9) problems and obstacle

10) the key to success and unsuccess of the project

11) gaps and barriers

12) suggestions and recommendations

Thanks for your usefully information.

APPENDIX B

In-depth interview question structure for the community architects

Interview No. _____

Subject Co-creating built environment for sustainable development: a case study of Ban Moh, Mahasarakham Province

Remarks

1. This interview is a part of dissertation research of Assistant Professor Chainun Prompen, a doctoral candidate in the Environment, Development and Sustainability program at Chulalongkorn University.

2. The purpose of this interview is to understand the processes and practices in co-creating built environment for sustainable development as appeared in a case study of Ban Moh, Mahasarakham Province.

3. An interview consists of two sections including general information and in-depth question towards co- creating built environment for sustainable development.

The results of the interview will be used to analyze in this dissertation only. All personal data provided will be strictly kept as confidential.

Your cooperation in this research is highly appreciated.

Part 1 General information

Name _____

Position in the research project _____

Job responsibility _____

Partner and team _____

Time spent during the project _____

Sequence of your tasks

1) _____

2) _____

3) _____

4) _____

5) _____

Part 2 In-depth question towards co- creating built environment for sustainable development

Concept of co-creation and processes

What are the different between co-creation and public participation from your view?

How does the project develop?

Source and processes of project funding

Why did you take part in the project?

How about the working processes and practices of the project?

1) background of the project

2) the initial process of select the community, and the development

3) the preliminary study stages

4) the public participation processes

5) activities in the project

6) tools using in the project

7) how to communicate with others?

8) network and groups in the development

9) problems and obstacle

10) the key to success and unsuccess of the project

11) gaps and barriers

12) suggestions and recommendations

Thanks for your usefully information.

APPENDIX C

In-depth interview question structure for the community members

Interview No. _____

Subject Co-creating built environment for sustainable development: a case study of Ban Moh, Mahasarakham Province

Remarks

1. This interview is a part of dissertation research of Assistant Professor Chainun Prompen, a doctoral candidate in the Environment, Development and Sustainability program at Chulalongkorn University.

2. The purpose of this interview is to understand the processes and practices in co-creating built environment for sustainable development as appeared in a case study of Ban Moh, Mahasarakham Province.

3. An interview consists of two sections including demographic information and in-depth question towards co- creating built environment for sustainable development.

The results of the interview will be used to analyze in this dissertation only. All personal data provided will be strictly kept as confidential.

Your cooperation in this research is highly appreciated.

Part 1 Demographic information

Name _____

Gender _____ Age _____

Occupation _____

Religion _____ Nationality _____

Language _____

Position in the community

(community leader / community committee / house owner /others _____)

Participated in house renovation project? (Yes / No)

Household members

1) _____ Gender _____ Age ___

Occupation _____

2) _____ Gender _____ Age ___

Occupation _____

3) _____ Gender _____ Age ___

Occupation _____

4) _____ Gender _____ Age ___

Occupation _____

5) _____ Gender _____ Age ___

Occupation _____

Part 2 In-depth question towards co- creating built environment for sustainable development

How does the project develop?

Why did you take part in the project?

Questions about your house renovation, in a case of participated

Which parts of the house that develop in the renovation?

Why to develop this part?

Budget from the community fund and your payment

Do you want to continue the project?

Does the project success in your opinion? Why does?

How about the working processes and practices of the project?

1) background of the project

2) social system in Ban Moh

3) financial system of the community

4) the public participation processes

5) activities in the project

6) tools using in the project

7) how to communicate with others?

8) network and groups in the development

9) problems and obstacle

10) the key to success and unsuccess of the project

11) gaps and barriers

12) suggestions and recommendations

Thanks for your usefully information.

APPENDIX D

List of interviewed key informants

Key informant	Position
Mr.Sudsakorn Chaiyot	Assistant Village Headman, House owner No.52
Mr.Jamnong Insorn	Village committee, founder of community center
Mrs.Ranu Chaiyot	Head of the Village Health Volunteer
Mrs.Ranjuan Wangsiwklang	House owner No.137
Mr.Prasert Buaklang	House owner No.97
Mr.Sangwian Wangtiwklang	House owner No.114
Mr.Manas Sriarkas	House owner No.99
Mr.Prajuab Tophimai	House owner No.175
Mrs.Somsri Sanarmat	House owner No.17
Ajarn Paungpen Wibulswasdi	Research project leader in Ban Moh project
Asst.Prof.Rangsit Tunsukee	Researcher in Ban Moh project
Asst.Prof.Dr.Anuwat Karntak	Researcher in Ban Moh project
Ajarn Umaporn Bupphachai	Researcher in Ban Moh project
Asst.Prof.Dr.Sakkarin Saephu	Researcher in Baan Mun Khong
Asst.Prof.Sureepan Supansomboon	Researcher in Ban Moh project
Ajarn Worawit Chantadej	Researcher in Ban Moh project
Mr.Narenphong Sawangsai	Research staff (student) in Ban Moh project
Mr.Wissawakorn Thangthong	Research staff (student) in Ban Moh project
Ms.Benjarong Thumpadcha	Research staff (student) in Ban Moh project

Key informant	Position
Ms.Wanwilai Wayalun	Research staff (student) in Ban Moh project
Mr.Wiroondej Kaewpoon	CODI researcher
Mr.Amporn Patsart	Ban Pred Nai community leader
Mr.Manoch Peungrung	Ban Pred Nai Village Headman
Mr.Supakij Huangnam	Ban Pred Nai community leader
Ms.Praphaphan Chatmalai	Community leader of Chantaboon community
Mr.Mek Sayasewi	Co-founder and community architect from CROSSs (researcher from Pru Nai community hospital (Phang Nga Province), community architect from Benchalak Chaloem Phrakiat Hospital (Si Ka Ket Province)
Mr. Apichart Rungsangwerapan	Community architect from CROSSs
Mr.Chawanat Luanseng	Community architect from CAN (coordinator from co-create Chum Saeng)

VITA

NAME	Chainun Prompen
DATE OF BIRTH	12 July 1976
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INSTITUTIONS ATTENDED	Graduate School
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