The Community-Owned Transit Improvement based on Local Business Project Model

P Iamtrakul¹, S Hirunsalee² and S Chayphong³

¹,³ Center of Excellence in Urban Mobility Research and Innovation, Faculty of Architecture and Planning, Thammasat University, Pathumthani, 12121, Thailand.
² Founder and Managing Director of The TSIS Limited Partnership, Nonthaburi, 11000, Thailand.

The corresponding author’s e-mail: iamtrakul@gmail.com

Abstract. The community-owned transit improvement program aims to study the socio-economic aspects of developing community-owned enterprises. It is based on the context of developmental work of a selected case in Lat Phrao communities. Developing a sustainable program will not only be beneficial to achieving accessible transportation system, but could also be beneficial in terms of community development and local economy improvement as well. This study utilized the financial feasibility analysis tools for the decision-making process like benefit-cost ratio (BCR), payback period, net present value (NPV), and internal rate of return (IRR) to analyze each project. The result of this research showed that Lat Phrao communities’ return on investment is faster and better after the communities’ expression of interest in long term investment with emphasis on IRR result. There are several alternatives for transferring rights, which includes: 1) transferring rights between lands of a single owner, and 2) transferring rights among the different landowners. Additionally, within each of these alternatives, there can also be 2 types of transactions: 1) private transaction and 2) normal transaction through authorized facilitator.

1. Introduction
Water transportation along the Lat Phrao canal is increasingly playing an important role in local transport, business operations and lifestyle of inhabitants and those within that axis. Following up on the output of the Hybrid Canal-Rail Connectivity research project, as undertaken by Thammasat University (2014-2015), the city of Bangkok is now looking to create new boat routes along the canals. Connecting the canal network with the metro network would enable people to plan their daily activities using guaranteed time schedules. This is because both systems are traffic free with fixed arrival times. Through previous research and findings, as well as collaborations with many public sectors, the government has adopted the idea of connecting Bangkok canals to the metro transit routes [1]. This is why the first pilot canal to be explored and revitalized is the Lat Phrao canal. At present, the community along the Lat Phrao canal, in the Huey Kwang district has already created several “community ports” to transport goods and services to local shops along the canal. More than half of the canal settlers are micro-entrepreneurs, who own some sort of local business, particularly grocery shops. Presently in some communities along the Lat Phrao canal, the government has developed some projects to develop the surrounding area along the Lat Phrao canal. For the purposes of preventing flooding in Bangkok, a total
distance of 45 kilometers concrete dam with relocating houses was constructed along the encroaching canals and dam construction lines for new houses and communities for a total of 50 communities comprising 7,069 households [2]. The said area as depicted in Fig. 1 is in a community area located in the Lat Phrao canal, with an efficient canal system. This current government’s plan to widen the canal for the purpose of flooding protection will definitely affect the settlements along the canal [3]. Without relocating the people, the physical development plan(s) to accommodate both the existing community and the new transit nodes is crucial. In addition, the government has realized the effects of the housing inequality problem and decided to develop and improve housing in various ways according to the problem; the ability to afford the conditions and needs of the community. However, the main mechanism for sustainability in development should be considered to create self-reliance that can promote social and economic opportunities at the same time that goes beyond an opportunity for the benefit of just the community.

Figure 1. Current situation of housing development project.

It should focus on building the identity of the community in order to increase its bargaining power of accessing the rights and opportunities that arises from being a vulnerable community to a strong and sustainable community. It is imperative to build a city with the participation of all people, where everyone can harness the proceeds from the city resources. With proper management and planning, the capacity of the city can be built to create opportunities for a better quality of life for all groups of people. Therefore, this study focused on discussions around the socio-economic aspects of developing community-owned enterprises, based on the context of the development in Lat Phrao communities that brings different stakeholders to the table to share their needs on transportation, investment and physical improvement opportunities to achieve the upcoming business model(s) of community-owned canal transit.

2. Literature review

2.1. Community-Owned Business Structures

In order to understand the nature of community-owned businesses, it is necessary to go back to the origin — why a community wants to set up and own a business enterprise in the first place. According to National Main Street Center, a US-based organization working to encourage “preservation-based community revitalization”, the origin of community-owned business differs from those of traditional business in that it is driven by purposes other than a purely financial one [4]. When a community is facing systematic risks such as drug problems, decaying downtown areas or market gaps such as high unemployment rate, it addresses such problems creatively and entrepreneurially to satisfy market needs in the community. Just as is the case for any business endeavor, a community-owned enterprise is viable when there is a market opportunity for it. These opportunities are left to community members to solve because the risks that come with them may be too high for privately owned enterprises. In such case, a community-owned enterprise is an ideal alternative to fill the gap. There have been several successful community-owned models in Thailand. For example, Samchuk Market, that won the UNESCO’s Asia-Pacific Awards for Cultural Heritage Conservation is one [5]. Faced with threats of severe economic
downturns and land reclamation, Samchuk community leaders pushed forth a campaign to preserve Samchuk Market as a historic place with a history of more than a hundred years. These engaged community members set up a committee called the “Committee for Preservation and Sustainable Development of Samchuk Market” to spearhead the campaign including founding a local museum called Baan Khun Jamnong Jeenarak, renovating the community’s signature architecture and art, revitalizing local stores and shops, and publicizing the market. It should be noted, however, that the committee itself and the market are not legally registered as a juristic person. It operates purely on voluntary basis from people in the community who take turns assuming positions in the committee.

2.2. Participatory Process Framework
The more the participatory approach, the more transparent decision making will become and the more visible obstinate members will appear. Arnstein, Sherry (1969) introduced a typology of eight levels of participation that illustrates a ladder pattern with each rung corresponding to the extent of citizens’ power in determining the end product [6]. Kreiken (2008) summarizes Sherry Arnstein’s “ladder of citizen participation, it consists of; (1) manipulation (2) therapy (3) informing (4) consultation (5) placation (6) partnership (7) delegated (8) citizen control [7]. Even 8-rung are not enough to accurately differentiate between the levels of participation because there are many more distinctions between the way people participate in policy and programs.

2.3. Community Asset Assessment and Need Assessment
Asset Assessment: the asset assessment is an important tool to understand the actual needs of communities as well as know the valuable resources and ways to address the right strategies for development in the communities. The potentials of the communities are extracted by Asset-Based Community Development approach and mapped on the physical space to define specific locations of where future business should be developed based on where current businesses are operating using ‘Perception of Potential’ approach. ABCD leads to the development of policies and activities based on the capacities, skills and assets of lower income people and their neighbourhoods [8].

Need Assessment: it is the process of identifying needs, prioritizing them, making need-based decisions, allocating resources, and implementing actions in organizations to resolve problems underlying the important need [9]. Focus group and in-depth interview were chosen as the ways to approach the community for deeper discussions and further insights instead of participatory workshops due to the internal conflict within and between the communities in the district regarding boat transportation. Therefore, focus group and in-depth interviews for each community are suitable approaches in this situation since they prevented direct confrontation and possible conflicts.

3. Data and methods
This study focuses on the socio-economic aspects of developing community-owned enterprises, providing the context to the development work in Lat Phrao communities. From the analysis, potential development around the location of the pier leads to the establishment of community owned businesses. The approaches that were used includes: group discussion, asset-based community development (ABCD), and perception of potential (PoP). The focus group and in-depth interviews were conducted in terms of a workshop to gain more insight. The interviewees were asked to give their opinion on the expectations of their financial positions in the near future if the community-based enterprise occurred. This financial position helped the business team identify the possible businesses and business feasibility. Table 1 contains the list of the questions. Lastly, in order to finalize the interview, the interviewers asked exit questions in order to receive additional insight and information from interviewees. Exit questions were about improvement within the community, obstacles for community-based enterprise, etc. After that, the interviewers expressed their gratitude for the interviewees’ time and information offered before leaving the interview.
Table 1. The questions for in-depth interview.

| Community’s contexts | Point of view |
|----------------------|---------------|
| 1) What is the most common business found in this community? | 4) From the above, Is there an opportunity for local business? |
| 2) What is the type of people that comes to visit this community? | 5) Are you interested in Smart Boat? If you are, would you be interested in becoming involved with this project? (Explain concepts of “Smart Boat” before asking questions) |
| 3) Please describe potentials of the community by using ABCD as a guideline? | 6) From the mentioned community-based enterprise, how positive are you toward establishment of a community-based enterprise? |
| | 7) How can you be assured about community-based enterprise? |
| | 8) How many members are appropriate for a community-based enterprise? |
| | 9) How much investment is affordable for everybody? |
| | 10) How long is the payback period that you can afford? |
| | 11) What is your expectation for the annual profit? |

The data collection was designed ahead of time and divided into 3 parts:

1. Workshop and in-depth, and closing questions.
2. The possible forms of future community businesses along with a recommended legal framework for business development was stated in three levels: individual level (sole proprietorship), community level (community owned cooperatives) and district level (public-private partnership law and transfer development right).
3. Financial feasibility was carried out for project decision making process with the calculation of three investment indicators:

   1) Benefit-cost ratio (BCR): the BCR is a systematic method for estimating the strengths and weaknesses of the proposed project developments. A problem that is to be subjected to cost-benefit analysis must generate a number of alternative social states which are to be compared [10]. BCR is the ratio of the benefits of a project or proposal relative to its costs in discounted present values [11]. The strength of this method is that it provides a framework for analysing data in a logical and consistent way.

   2) Net present value (NPV): the NPV is defined as the sum of the present values of incoming and outgoing cash flows over a period of time. The importance of the NPV calculation is the period of time which must be specified in the cash flow analysis. The NPV can present both the positive and negative values. The positive value means the project’s profit, while the negative presents the project’s loss. The calculation normally uses the standard discount rate, which must be updated and specific to the project location [12-13]. The following is the formula for calculating NPV:

   $\text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_0$  \hspace{1cm} (1)

   Where: $C_t$ = Net cash inflow during the period
          $C_0$ = Initial investment
          $r$ = Discount rate, and
          $t$ = Number of time periods
3) Internal rate of return (IRR): the IRR is defined as the interest rate at which the net present value of all the cash flows from the investment equal zero, and it is used to evaluate the attractiveness of the project investment. If the IRR of the proposed project is higher than the normal development required rate of return, then the project is regarded as attractive. On the other hand, if it is lower than the required rate of return, the project should be rejected [14]. The following is the formula for calculating IRR:

$$O(NPV) = P_0 + P_1/(1+IRR) + P_2/(1+IRR)^2 + \ldots + P_n/(1+IRR)^n \quad (2)$$

Where: $P_0$ = Initial investment

$P_1$, $P_2$, $P_n$ = Cash flows in periods 1, 2, n, respectively; and

IRR = Internal rate of return of the proposed projects.

The tools mentioned above are used to analyze the feasibility of the business. There are three possible levels of initiating the business in this study, they are: 1) District level 2) Community level and 3) Individual level. Since this study serves as a proposal of potential businesses in the study area, incomes (benefits) and expenses (costs) are analyzed based on the assumptions provided in the following part only. The latter part of this article will provide a comparison table, where Cash Flow analysis results of all cases will be shown. This business project with best potential to maximize business value is clearly stated along with the framework of this study in Fig. 2.

![Figure 2. Framework of study.](image-url)
4. Results and discussion

4.1. Characteristic of Lat phrao canal
The Lat Phrao canal is one of the longest canals in Bangkok and its vicinities. The length of this canal is approximately 46.421 Kilometers (From Bangkok to Pathumthani province). The canal’s segment in Bangkok Metropolitan Area is 20. 62 Kilometers long (Fig. 3). The direction of the Lat Phrao canal is aligned with the northern part of Bangkok connecting the Saen Saeb canal in the central part of Bangkok. It runs in a northbound to southbound direction which is similar to Paholyothin Road and Viphavadi Road. At present, there are seven points of connectivity between the waterway and rail system in the Bangkok Metropolitan Area. This will be increased to twenty points of connection by the time the Mass Rail Rapid Transit project is in full operation within the next twenty years (by 2020). Considering the potentials of the Lat Phrao canal for navigation, if this route is used for navigation, it would generate at least twenty-eight points of connectivity between piers and mass rapid transit stations. And this could help passengers to manage their travel plans from the northern part of Bangkok to the central part of Bangkok. Currently, the lands along the Lat Phrao canal’s embankments belong to the Treasury Department, where informal communities have long been utilized as residences. The Lat Phrao canal redevelopment is inevitably imposing a risk to the informal communities along the canal. Some communities have to be relocated and all of the remaining communities along the canal have to be re-blocked to fit with the remaining embankment after canal revitalization. CODI and BMA have long been working with the communities to encourage a community saving cooperative for a collective housing scheme. However, the communities must bear extra living expenses without gaining more income from their current jobs. All of the communities in this study area are located in the orange zoning, where moderate residential mixed-use programs are encouraged.

4.2. Focus group and in-depth interview about local business potentials
4.2.1 Local Business Potentials: The results from the workshop showed that participants agreed to possible forms of future business in Lat Phrao communities stated in three levels: individual, community and district. Participants elaborated further that the district level of association has the highest potential
due to the cooperation it has with the private sector. Community level also has some potential because of the businesses and vocational training groups already existing in the communities. On the other hand, individual level has the lowest potential to be developed in the near future due to the skills and mindsets on business as well as its costs. Potential businesses are listed in Table 2.

4.2.2 Local Business Potentials: From the results of needs assessment, the businesses at the individual level have the highest potential as people are interested in individual level businesses. According to the data, some community has no business potential at the community or district level because the people are not interested as shown by the respondents from the community. Nevertheless, they are individually interested in Smart Boat as it will bring more visitors into the community and provide them a chance to sell products at the pier. At individual level, there is the potential to become an AirBNB because some community members are already running the business of house renting. More than 30 houses in the community are for rent and they also have about 15 grocery stores, local food shops and motorbike garages which would be convenient for tourists wishing to visit the community. On another hand, some community has potential at the individual level of business as they could do merchandise and living markets which could develop into the community level as they mentioned cooperation with Rama 9 Pattana community

Table 2. Potential business and its description.

| Levels     | Business                  | Description                                                                                                                                                                                                 |
|------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| District   | Smart Boat                | Smart Boat is a transportation service provided collaboratively by private and public sectors and community members. Private sector plays its part as an application developer and intermediary between commuters and boat operators, while the community members who owns the boats uses the mobile application from the private sector to start their own business as a boat operator. |
|            | Coop Boat                 | The cooperatives can form a joint venture or a corporation and apply for a concession from related government authorities to operate the boat service along the canal. In this case, the joint venture may also have to deal with public-private partnership law. Alternatively, in a similar fashion to the Smart Boat model, the cooperatives can act as intermediaries to connect commuters and boat operators. In such case, the cooperatives may be able to avoid concessions and public-private partnership requirements. |
| Community  | Research Trip             | Visiting community and homestay service can be recommended by the participants. The community has an idea to welcome students and researchers that will travel to the community to study the life and culture in the community as a way of increasing the number of tourists. This will help the community generate more income when more people visit the community. Also, service and housing cooperative is in the process of registration so as to operate homestay services for tourists. |
|            | Solar Energy Power        | Metropolitan electricity authority (MEA) is buying solar energy from households. A case study of Ban Mun Kong Bangkok and Samut Prakan, where 40 households are participating in the project of selling electricity to MEA. Consequent upon this, their household’s income has increased by 2,500 baht per month and 10% deduction from the income is invested in the Social Welfare Fund. This makes selling solar energy power possible in their view. However, the cost of installation of the PV solar cell is 200,000 THB and it takes approximately 7 years to reach the breakeven point. |
|            | OTOP Product Center       | Many communities have interesting products being sold within the community. This community has local businesses providing many products like herbal products, bead knitting, merit coins and dish washing soap. These products have the potential to be developed into OTOP products. |
| General    |                           | As mentioned before, Smart boat has a very high potential to become a business after...
At the community level, some communities already established cooperatives between communities and some groups in their own communities. They did not only mention potential groups, but also include the concept of a ‘Living museum’, learning local community way of life and research trip for outsiders. As they stated, the community has arranged ‘floating markets’ before and they wish to recreate and operate the markets again. Some communities brought up boat transportation using small boats. With a concept of forming a co-operative with other communities. As a result of this, community level has a great association with each community while at district level, they believe that they cannot operate any business. In conclusion, clearer businesses that based on community needs were stated from the in-depth interviews with the communities. Meanwhile, matching community needs and assets required the study of 5 potential businesses to understand more on each one’s financial performance.

4.3. Local business potentials classified by levels

4.3.1 District Level: Smart Boat GRAB Taxi is the ride-hailing logistic service network for taxis and other individual cars. Likewise, Smart Boat will be the new water logistic for boat users which will enable users to check boat routes, boat locations, available seats, and booking seats through an application on a smartphone. Initially, the plan was to develop 4 existing piers that will operate from 6 AM-10 PM. With support from private sector for development, the cost of an online platform or application and boat (i.e. about 50% of total cost will be given as support) as assumed. In hypothesis, it is assumed there will be 6 local boat drivers to make 54 trips per day to serve an estimate of 860 passengers per day.

4.3.2 Community Level: Research Trips started with the appreciation of community potential to collaborate with academic institutes. The Research Trips model will operate through collaboration between community and university or other academic institutes. This kind of activity will be like a run
1-day workshop trip for sightseeing and learning with the local community. Initially, it is assumed there will be 10 participants for a trip and 4 research trips per month, therefore there will be 40 participations per month. For community income, an amount of 1,500 THB for participation is expected. The fee includes 1 lunch and 2 coffee breaks for each participant.

4.3.3 Individual Level:

1) **AirBNB** is an online marketplace which enables people to rent a house and house owners to lease out their house on a short-term basis. The online operation works through online application on a website. It resembles matching a vacant or unused room to serve the accommodation needs of travelers with a variety of rental choices such as apartment, homestay or hostel. The size of the rental rooms will start at 5x3 sq.m. and the expected rental price is 800 THB per room for 2 persons. In addition, the AirBNB service depends on individual members’ decisions.

2) **Laundry House** is a commercial establishment for laundering and drying clothes. The first floor or a unit of the building will be renovated and equipped with several automatic washing machines and clothes dryers. Benefits and incomes will be generated from the use of these machines, which have several prices depending on use. The washing service fee will start from 20 to 30 THB.

3) **Grocery Store** is a commercial establishment for selling daily basic goods such as snacks, sandwiches, lunch boxes, bath stuffs and other items, and these stores are located near boat stations and piers.

The first floor of the building will be renovated and equipped for storage and sales. The benefits and incomes will be generated from selling goods with a profit of around 30% to 100% from the first year depending on the kind of products. However, grocery stores depend on individual members’ decisions. Also, the initial assumption of the set profit from sales is expected to be 100% in the first year. For the second year onwards, the profit is expected to be 110% because after the first year the operator will have a better understanding of market needs and products, which would help the owners or operators generate more income even they do not increase costs. Therefore, we expect this business to be scalable after the first year.

4.4. **Financial Feasibility Analysis**

The final step in a ‘Cash Flow’ analysis is to make a recommendation on the most efficient cases. Based on the summary table provided below, the case of ‘Research Trip’ tends to show the most Net Present Value (NPV), Internal Return Rate (IRR) and is most profitable from B/C ratio. However, the cost of starting the project is the second highest among other five projects, and is also at the community level, which means initiation of the project must be planned at the community level. A good fund-raising plan for the community to get involved in doing inclusive business should also be strategized. There are five scenarios analyzed in this study, which are: (1) Smart Boat (2) Research trips (3) AirBnB (4) Laundry house and (5) Grocery Store. The brief description of the project is as follows:

1) **Scenario A**: Smart Boat: Smart Boat will be the new water logistic for boat commuters, operated in collaboration with the people in the community. Smart Boat will allow its users to access information about route, map location of the piers, available seats and booking through the application via smartphone. The fee for using Smart Boat is 10 THB per passenger. And 4 exiting piers that will provide services will be developed first in this Smart Boat project. The result showed that from initial Smart Boat model assumption calculated, NPV = 767,895.14 THB, B/C ratio (10 years) = 1.207, and IRR (10 years) = 11%.

2) **Scenario B**: Research Trips: The idea for Research Trips started with the recognition of community potentials to collaborate with academic institutes. The Research Trips model will operate through the collaboration of community and university or other academic institutes. The kind of activity will be in form of a 1-day workshop trip for sightseeing and learning with local communities. Initially, it is assumed that there will be 10 participants for a trip and 4 research trips per month; making it 40 participants per month. For community income, an amount of 1,500 THB for participation is expected as fee. The fee includes 1 lunch and 2 coffee breaks for each participant. The result showed that from
initial Research Trip model assumption calculated, NPV = 65,759.87 THB, B/C ratio (Year 1) = 1.022, and IRR (Year 1) = 34%.

3) Scenario C: AirBNB: This is an online marketplace which enables people to rent a house and the house owners to lease out their house on a short-term basis. The online operation works through online application on a website. It resembles matching a vacant or unused room to serve the accommodation needs of travelers with varieties of rental choices such as apartment, homestay or hostel. The size of the rental rooms will start at 5x3 sq.m. and the expected rental price is 800 THB per room for 2 persons. In addition, the AirBNB service depends on individual members’ decisions. The result from initial AirBNB model assumption calculated showed that: NPV (Year 1 - 10) = 239,994.96 THB, B/C ratio (10 years) = 1.285, and IRR (10 years) = 32%.

4) Scenario D: Laundry House: This is a commercial establishment for laundering and drying of clothes. The first floor or a unit of building will be renovated and equipped with several automatic washing machines and clothes dryers. The benefits and incomes will be generated from the use of these machines, which will have several prices depending on the use. The washing service fee will start from 20 to 30 THB. The result from initial Laundry House model assumption calculated also showed that: NPV (Year 1 - 10) = 298,866.66 THB, B/C ratio (10 years) = 1.439, and IRR (10 years) = 37%.

5) Scenario E: Grocery Store: This is a commercial establishment for the selling of daily basic goods such as snacks, sandwiches, lunch boxes, bath stuffs and others, located nearby the boat stations and piers. The first floor of the building will be renovated and equipped for storage and sales. The benefit and income will be generated from selling goods with a profit of 30% from goods cost. Grocery stores operation depends on individual members decisions and the initial assumption sets revenues from sales for 50% from stock in every month till the 6th month when growth will reach 75% from stock. The result from initial Grocery Store model assumption calculated showed that: NPV (Year 1 - 10) = 66,902.50 THB, B/C ratio (10 years) = 1.135, and IRR (10 years) = 31%.

| Level   | Cases            | Costs (THB)   | Benefits (THB) | NPV (THB)   | B/C Ratio | IRR  |
|---------|-----------------|---------------|----------------|-------------|-----------|------|
| District| Smart Boat      | 22,747,200.00 | 27,466,250.00  | 767,895.14  | 1.207     | 11%  |
| Community| Research Trip  | 7,047,050.00  | 7,200,000.00   | 65,759.87   | 1.022     | 34%  |
| Individual| AirBNB        | 2,055,000.00  | 2,640,000.00   | 239,994.96  | 1.285     | 32%  |
|          | Laundry House  | 1,013,000.00  | 1,458,000.00   | 298,866.66  | 1.439     | 37%  |
|          | Grocery Store  | 1,152,000.00  | 1,308,000.00   | 66,902.50   | 1.135     | 31%  |

Conclusively, the Smart Boat project has shown to represent the lowest return on investment in both NPV, IRR and B/C ratios, although there is a projected assumption that Smart Boat Company will be providing the financial resources for most of the development cost. Therefore, the business and financial model of Smart Boat project should strongly be reconsidered, and the current assumption at the moment is not recommended for the community. In terms of potential business in the individual levels, the Laundry house project was able to generate the highest IRR for investors when the feasibility among the other three projects is compared. Also, the Laundry house created the best B/C ratio for investors. In summary, all the projects are feasible for the investment decision since the NPV is shown to be positive, the IRR higher than the investment in the bank, and B/C ratio greater than 1 in every project.
5. Conclusions
Lat Phrao communities have a wide range of potentials for creation of local business. But it needs various improvements such as accessibility, transit services, urban activities spaces, and community activities [15]. And if Lat Phrao canal is revived, it will strengthen the local business scaling by bringing more commuters to the area. Without reconstructing the canal to serve as a channel of transportation, other businesses at the individual or community levels will not be able to fully develop. The analysis of the results from community assets and need assessment in this study showed that communities agreed to the possible forms of future businesses in the Lat Phrao communities, presented in three levels - individual, community and district level, respectively presented based on their preferences. Most community members prefer to have their own business rather than cooperate with others in the communities. The most popular businesses that was brought into the discussion was AirBnB, laundry house, and grocery store. The second most preferred business was a research trip in collaboration with academic institutes. The feature of the research trip includes a one-day workshop, sightseeing and learning with local community. This business has been informally operated for many years, therefore communities are certain of the quality and hospitality of the trip. The idea of a Smart Boat service was also brought into the discussion. Some members agreed that adopting this Smart Boat idea will ensure more direct contributions in return, however some disagree and voice the concerns of negative impacts it might result to after the expansion of the canal, and wholly operational of the boat services. The results from the feasibility study also suggests that the performance of each scenario is in congruity with community preference. It showed the B/C Ratio of all scenarios are not much different. The research trip scenario has the best IRR, even though its NPV is not as high as the Smart Boat scenario. However, for Lat Phrao communities, a faster return on investment is better since communities expressed their struggle with long term investment, therefore, the IRR result should be considered superior. For the implementation of Smart Boat at district level, the mechanism of Transfer Development Right (TDR) and detailed approvals for setting up boat business were introduced. There are several alternatives to transferring rights, such as: 1) transferring rights between lands of one owner; and 2) transferring rights among the different landowners. Additionally, within each alternative, there can be 2 types of transactions: 1) private transaction and 2) normal transaction through authorized facilitator.

References
[1] Iamtrakul P, Srivanit M, and Klaylee J 2017 Resilience in Urban Transport Towards Hybrid Canal-Rail Connectivity Linking Bangkok’s Canal Networks to Mass Rapid Transit Lines BUILT 10 pp 27-41
[2] Siamrath 2020 https://siamrath.co.th/n/173605
[3] TCIJ 2020 https://www.tcijthai.com/news/2016/14/scoop/6301
[4] National Main Street America n.d. Preservation-based community revitalization https://www.mainstreet.org/home
[5] UNESCO 2009 Sangin Dalai Monastery in Mongolia wins the Award of Excellence in the 2009 UNESCO Asia-Pacific Heritage Awards.
[6] Arnstein S R 1969 A Ladder of Citizen Participation Journal of the American Institute of Planners 35(4) 216-224. DOI: 10.1080/01944366908977225
[7] Kreiken W 2017 Eight levels of public participation 2008 (In Coastal Wiki).
[8] Kretzmann J P and McKnight J 1993 Building communities from the inside out: a path toward finding and mobilizing a community’s assets. Evanston, IL: Chicago, IL: Asset-Based Community Development Institute (Institute for Policy Research: Northwestern University)
[9] Altschuld J W and Kumar D D 2012 Needs Assessment: An Overview (SAGE: Publications, Inc.)
[10] Suden R and Williams A 1978 The principles of practical cost-benefit analysis (Oxford: Oxford University Press)
[11] Campbell H F and Brown R 2003 Benefit-Cost Analysis: Financial and Economic Appraisal Using Spreadsheets (New York: Cambridge University Press)
[12] Remer D S and Nieto A P 1995 A compendium and comparison of 25 project evaluation
techniques. Part 1: Net present value and rate of return methods International Journal of Production Economics Elsevier 42(1) pp 79-96

[13] Ross S A 1995 Uses, Abuses, and Alternatives to the Net-Present-Value Rule Financial Management 24(3) pp 96-102

[14] Ruegg R T and Marshall H E 1990 Internal Rate-of-Return (IRR), Building Economics: Theory and Practice Springer pp 67-78

[15] Iamtrakul P Raungratanaamporn I and Klaylee J 2018 Contribution on water transportation for resilient and sustainable lowland cities Lowland Technology International 20(3) pp 341-350

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