Urban Logistics Planning of Kho Chang Port Island Trad Province, Thailand

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With the potentiality of Thailand in being ASEAN's logistics center, the past and present governments have given emphasis on this matter. Many strategies and projects have been continuously initiated to promote Thailand to be the logistics and transport hub of the region, be it land, sea, or air. One of the projects that is fully supported and given large budget allocation is the Phase 1 of the Special Economic Zone in five bordering provinces (Tak, Mukdahan, Srakaew, Trad, and Songkhla). Presently, the Trad Special Economic Zone Project is one of the projects with much progress.

As for sea transportation, Laem Chabang Port is aimed to be the major port of the country as it facilitates good access for sea-land transportation and thus it enjoys a success as being international deep-sea port. However, an obstacle occurs in facilitation of transshipments between ocean liners and feeders as the Port is not a destination of major goods in ASEAN, neither does it locate in the world's liner routes. As ocean liners will only land at the Port when there are shipments sent to Thailand, Laem Chabang Port thus has small number of ocean liners. Instead of the Port, large number of transshipment activities, both for bulk cargos and container ships, take place in the Gulf of Thailand 24 hours a day near islands and along the coast in Sriracha, Chonburi, Rayong, as well as around Koh Samed Island and Koh Sichang Island. Not only cause pollution to the sea, these activities are also against the sea transportation network principles within the Gulf of Thailand.

Aware of this problem and the importance of the Special Economic Zone development, especially in the sea border area, the Logistics and Supply Chain Management Program, Chulalongkorn University thus initiated the research "Urban Logistics Planning: Koh Chang Port Island, Trad Province, THAILAND", and organized the Academic Workshops by cooperating with naval officers and architectural, engineering, logistics, and marine transportation students. A Prototype Master Plan was made in order to test and study for an effective marine logistics development and support with less impact on the natural environment and the communities. On the transshipment port study and comparison, to have examples from both the eastern and western world, the Singapore Port and Hawaii Port in the United States have been used as case studies. This Research is part of Chulalongkorn University's “Waterfront Development Project (WFD. In order to achieve a perfect and sustainable development of Thailand, the study area covers significant activities on ports, transshipments, sea tourism, and sea border security.

1. Introduction

This issue is aimed at understanding key issues of configuration of urban structure of Kho Chang Port Island in case of its evolution and effectiveness of urban realm base on recent theories and debates. The investigation, limited by time, focuses on Singapore Port and Hawaii Port where some of them were chosen for case studies.

Research question

“What is a sustainable planning and design of the Kho Chang Port Island master plan suitable for urban community and Navy security perception?”

Aim and Objectives

1. To study projects owned by the Government, the Royal Thai Navy, and the surrounding communities; and set up a development framework of Koh Chang Port Island project, Trad Province, THAILAND in order to mitigate the impact on the urban areas.

2. To study the regional network and city plan in the related areas in line with the Special Economic Zone (SEZ) development plan of Thai Government.

Merit of the Proposed Research

1. For creating an innovation of urban logistics planning in academic perception. It will be useful for both learning of Urban Logistics Planning and Environmental Management in terms of port city.

2. For creating urban structure prototype of navy and port city which might be useful for professional perception in Urban Logistics Planning and for consideration of port and urban control in city in future.

Value of the research and its significance

1. The research methodology employed illustrates the trend of the various research processes and investigation of the urban logistics planning of port city approach. There may be examples involving other research or urban logistics studies which may be conveniently adapted and applied to further demonstration and highlight individual areas of interest in connection with the urbanization process.

2. The facts/information obtained and the methodology employed in the research process can bring together the ideas or concepts involving other port city settlements. These processes can then be adapted to use in the port city management including the possible expansion of existing settlements. Such knowledge and information processes can serve a useful and valid purpose in helping to develop the principles of port city.

3. The determination of a perceptive substance is useful in terms of appropriate or assessing the possibilities of the existence of port city in Thailand for developing and redesign the specific principles for use in actual generic cases.

2. Research Methodology

Urban Planning and Design Analysis

1. Site analysis

2. Analysis of sea traffic and transport in the Gulf of Thailand (Internet search)
    1. Cargo ship routes
    2. Tourist ship routes
    3. Fishing boat routes

3. Location Planning, Zoning, and Master Plan
    1. Navy Port
    2. Commercial Port
    3. Port Hinterland

Master Planning

Master plan is a future principle plan or a pilot policy containing sub-plans that are in conformity. For master plan preparation, first of all goals must be set up and then the budget, organization, and function will be incorporated in the plan. To obtain such information, related people or operators can be further interviewed.

1. GIS Analysis Koh Chang Port Island

Figure 1: Koh Chang Port Island: Master Plan Analysis

2. Zoning

The main objective of Koh Chang Port Island is aimed at tourism, sea freight transportation, and sea bordering security. The development of bordering port towns concerns with both short- and long-distance sea freight transport, as well as international freight transport of some types of goods. The development area is divided into 4 zones as following:

1. Navy and Multi Propose Zone
2. Logistics and Supply Chain Zone
3. Sea Freight Factory Zone
4. Commercial, Business, Tourist Zone

Professional meeting and discussion to decide and planning for the necessary components need for Koh Chang Port Island by reduce any unclear and useless function for the operation in the study model.

3. Testing and Evaluating of Master Plan

3.1 Potential Surface Analysis (PSA) (Harvard university, 1969)

PSA is a technique for location assessment and analysis of the Seaport using the overlay mapping principle. This technique needs the Spatial Data and Attribute Data obtained from the Geographic Information System (GIS). PSA technique is divide area into grid table for put score in the area, this will analyses the potential of existing land use with indicators.

3.2 Space Syntax (University College of London; Hiller and Hanson, 1984)

Space Syntax is a theory on the components of space. Using the Space Syntax together with the Geographic Information System, models of the connectivity and urban morphological analysis can be made. The Space Syntax analysis helps in understanding the relations, and cause and effect of the city planning and utilization. The integration measurement of each component to the total system is calculated from the depth distance of each line against the total network. The density of the city is shown in various colors, the hot tone like red represents the area where there are highest natural movement and traffic with high integration value and easily accessible. On the contrary, the blue color represents the less traffic area with low integration value and difficult to access. In this analysis, the red area is the area where there are lots of activities, or a commercial area. The blue area is the area where there are less activities, peaceful and suitable for living.

3.3 Public Participation Workshop

Public Participation Workshop for commenting that Koh Chang Port Island to community and environments. (Environment effected and Navy Port effected) The conclusion will show how to establish and plan Sustainable Koh Chang Port Island and its operation affect to area surrounding and the region by the point of view of the public participation.

Environmental Engineering Issues

Environmental Engineering Issues	Urban Areas Affected
1. Port Waste Management 2. Dredging 3. Dredging Disposal 4. Dust 5. Noise 6. Air Quality 7. Bunkering 8. Hazardous cargo 9. Port Development (land related) 10. Ship discharge (bilge)	P1: Port and connecting areas P2: Communities and Villages P3: Natural Tourism P4: Conservation places P5: Coastal beach and fishing areas

Table 1: The Top-10 European Environmental Engineering Issues

The Top-10 European Environmental Engineering Issues, periodically ESPO and EPF undertake a survey of European Environmental Engineering to evaluate the progress made in environmental management, and to identify the Top Ten sustainable management issues. (ESPO Survey 2004) The academic workshop was established in 2015

Navy Port Operation Issues

Navy Port Operation Issues	Urban Areas Affected
1. Aim and Objective of Navy Port 2. Navy Port Zoning 3. Navy Port Combat Equipment and Capacity 4. Quality of Navy Supporting Office 5. National Security Issues 6. Effect of Navy Port to Urban Structure 7.Targeted Attacks Location 8. Business Related Issues 9. Industrial Related Issues	P1: Port and connecting areas P2: Communities and Villages P3: Natural Tourism P4: Conservation places P5: Coastal beach and fishing areas

Table 2: The Navy Port Operation Issues

4. Analysis of Koh Chang Port Island:

In term of Potential Surface Analysis; Land use of Koh Chang Port Island will be in good condition while transportation network are excellence condition. Infrastructure, Accessibility of Cargo and Commercial zones are in very good condition; moreover it showed that Koh Chang Port Island had high potential of those cases in term of overall city network. In term of Low-income access and Land ownership, Koh Chang Port Island keep fairly condition, while Open space and Green Area system of the city are in excellence condition.

In term of Space Syntax Software Analysis: connectivity and Global Integration of Koh Chang Port Island keep quality of planning and design in world class development level with high standard of planning.

Analyzing of the design and planning of Koh Chang Port Island, Trad Province, Thailand will assist Thailand to be the center of marine logistics in the near future.

1. POTIENTAIL SURFACE ANALYSIS		2. SPACE SYNTAX CONCEPT	
1. Land Use	4	1. Connectivity	4
2. Transportation Network	5	2. Global Integration	4
3. Infrastructure	3	Full Score 10 marks	8
4. Cargo Zone Accessibility	3		
5. Commercial Zone Accessibility	4		
6. Low-Income Zone Accessibility	3		
7. Open space System	4		
8. Green Area System	4		
Full Score 40 marks	26		

Table 3: Koh Chang Port Island Analysis 2016

Conclusion from the interview of academics and general people, via video conference and voice recording, in regard to the upgrading of the Koh Chang Port Island to be the Navy and Deep sea Port, most interviewees have positive responses on the development. In their opinions, the Koh Chang Port Island will facilitate transportation of both the sea freight and tourists. The people, business owners, and investors will enjoy increasing benefits. Due to the fact that the region is already the tourist areas with lots of tourism activities, the Koh Chang Port Island will therefore help accelerate the economy and tourism in the region. The growth and prosperity will increase job opportunities for locals and attract labors from outside. However, some local wisdom and culture may unavoidably be affected. The freight and tourist travelling will be a lot easier though a negative impact may also occur.

5. Conclusion

From the urban logistics Plan above, the corporation among Government and Private Sector are needed to determine Urban Logistics Strategy as Main National Plan in the near future. Koh Chang Port Island Plan is as a handbook to introduce Logistics Framework, moreover, the successful and efficiency implementation is in regarding on corporation field practice of the organizations concerned. Logistics planning, intelligent technology IT, scenarios simulation and computerization software will assistant them to complete Koh Chang Port Island operation with high potential and sustainable.

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