The Implementation of Soft System Methodology (SSM) for Systems Development in Organizations (Study Case: The Development of Tourism Information System in Palembang City)

Sandfreni[1], Fransiskus Adikara[2]
{sandfreni@esaunggul.ac.id[1], fransiskus.adikara@esaunggul.ac.id[2]}

Fakultas Ilmu Komputer, Sistem Informasi, Universitas Esa Unggul, Jakarta 11510, Indonesia[1,2]

Abstract. Nowadays the massive improvement in Information Technology, which integrates computer technology and telecommunication, has lead to revolution in the field of Information System. The positive momentum in the world of information technology that is indicated by the rapid growth of Internet usage should become a positive enablement in the development of tourism industry. The implementation of information technology could help the tourist in finding the information about tourist attractions, its facilities, route, distance, cost required to get there. Soft Systems Management (SSM) is one of the best options that can be used to support and define the tourism information system (e-tourism). The SSM defined system is expected to meet the system stakeholder requirements, such that give optimum value to the tourist and help the country to attract more tourists visiting the Indonesia.

Keywords: SSM, Tourism, Information System, Development, Palembang

1. Introduction

The World of Tourism is one of the foreign exchange-producing sectors that has considerable potential to be developed. If the tourism sector is well developed and managed it will make a large contribution to the country's finances. Undang-Undang (UU) No. 9 of 1990 states that tourism is everything related to tourism, including the exploitation of tourist objects and attractions as well as other businesses related to the field. The types of business in the field of tourism include several types of businesses including the types of businesses providing accommodation, providing food and beverages, providing tourist transportation, providing tourist facilities and tourism areas.

The development of the tourism sector will also have an impact on improving the welfare of the community, the real economic sector in society such as crafts, various foods, lodging, hotels and so on can develop, with the rise of the real economic sector will be able to increase the degree of community life both clothing, food , board, education and health. The amount of government support for the development of the tourism industry can accelerate the acceleration of the progress of the world of tourism in Indonesia. Through collaboration between the Ministry of Culture and Tourism and the Ministry of Communication and Information, the promotion of the tourism potential of Palembang city can be disseminated to the wider community both nationally and internationally, therefore advances in information and communication technology are very possible to be used as a means of promoting Indonesian tourism throughout the world.

In this era the media used to promote tourism is more than the previous period. The progress of information technology is one of the driving factors. This technology has been widely adopted by government, education, business and others as a means of promotion, dissemination of information and transactions, therefore the terms emerge as e-government, e-learning, e-business, e-commerce etc.

The world of tourism, which is one of the fields cultivated by the government, is the time to utilize Information Technology as an implementation in e-government to publicize and market regional tourism potential. By utilizing Information Technology means the existence of a Management Information System based on electronic data processing. However, in fact there are still many obstacles faced in the application of Information Technology including the limited human resources that are reliable in this field who are able to manage, utilize and develop information technology in tourism, the function of Information Technology for data processing and complex transactions and the provision of information for the public is still very limited, sometimes there are still reluctance of some bureaucrats to open access to the public even though the data and information is intended for public consumption.

As economic growth and community welfare increase, the need for a vacation is increasing so that information is needed about tourist destinations, attractive tourist attractions, available facilities such as transportation, tourism products and so on, however often tourists or potential tourists both local and foreign have difficulty to obtain this information because they do not know where and from whom information can be obtained. Therefore information in the field of tourism needs to be prepared properly and structured so that the public can access easily. In addition, Indonesia also does not yet have a software that can help plan tourism trips based on certain conditions, for example, the budget owned by tourists and tourist criteria desired by tourists. With a number of phenomena like this, of course it will have an impact on the growth of tourism in the city of

Palembang which should have the potential to develop rapidly. Besides that, especially for ordinary tourists who really need such information and services, they will also find it difficult. As a comparison, Singapore in marketing its tourism objects has utilized information technology well, the Singapore government through the Infocomm Development Authority (IDA) has established cooperation with the Singapore Tourism Board (STB) which is named Digital Concierge. Through Concierge, tourists will be served with handy and location-based personal services, they will also obtain various information such as interesting attractions around the location where the tourists are located, the information can be accessed through various mobile devices such as phones.

Based on the background, the researchers applied the Soft System Methodology (SSM) method to be able to provide tourist information for tourists with the development of the Tourism Information System in Palembang. The goal with this system is that tourists can easily obtain information that can attract tourists to come and take a vacation to the city of Palembang. From the research conducted then get the results of the analysis in accordance with the stages applied to the SSM method that can be used to improve the system or developing an existing tourism information system.

2. Research Methodology

Soft System Methodology (SSM) is a technique for analyzing and finding solutions to human activity systems developed by Peter Checkland (1999) and Brian Wilson (2001) through "action research". Soft system methodology is perfect for research whose main purpose is to conceptualize models, improve pragmatic actions, seek compromise, as well as joint and participatory learning such as classroom action research, organizational development, and community development. Soft System Methodology is a methodology used to support the structuring of thinking in complex organizational and community problems. With regard to this problem, soft system methodology is the process of identifying, formulating the root of the problem and solving it, finding and bringing together the opinions of the parties involved such as implementers, decision makers, users, and taking into account environmental conditions and general views of society / politics / social culture. Soft system methodology treats individuals as organizational units or communities that have differences and similarities.

Soft system methodology assumes that each individual will see the world differently. Different world views certainly lead to varied understanding and evaluation of any situation, which leads in turn to different ideas for positive action. Ideas do not always contradict each other (generally there is likely to be some overlap), but they may differ enough to make a difference in serious problems when deciding on an action. The basic model of soft system methodology is the seven-stage model. The whole process of soft system methodology is the process of mutual learning: practitioners learn about organizations; Organizational members learn about the diversity of views and in their organizations, and about their peers. In SSM the method used is a process involving the environment with relevant relationships between the real world and the conceptual model produced by the system, with the hope of finding and defining problems that provide alternative changes. There are seven steps in implementing SSM, as shown in Figure 1.
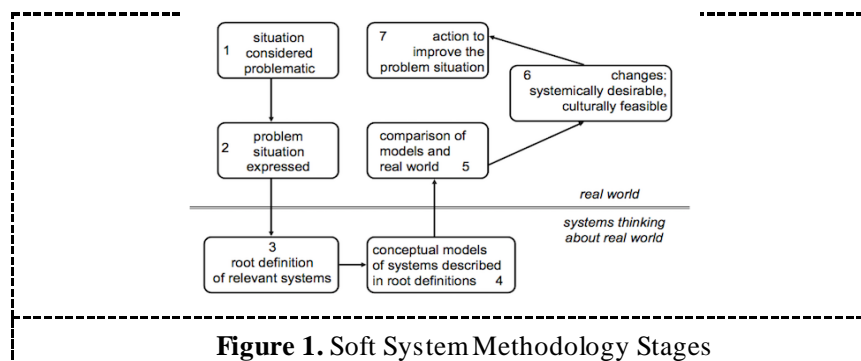

Figure 1. Soft System Methodology Stages

With the explanation as follows:
1. *Situation Considered Problematic*
   This stage aims to find out and define the situation and problems to be discussed, because the ultimate goal of the SSM itself is problem solving. At this stage information will be collected about the structure and process through research, data collection, and through indirect interviews to find the main problems that occur.

2. *Problem Situation Expressed*

This stage uses the rich picture aims to represent the current situation, problems that arise, existing conflicts, and the interests of each section.

3. *Root definition of relevant system*

This stage explains the problems that exist in the form of words. The purpose of the root definition is to look for what will be done, why it must be done, who is doing it, who is at a disadvantage or profit from existing problems and what environmental influences are limiting actions and activities to be carried out. An extension of the problem can be found using the CATWOE method. CATWOE consists of:

- *Customer* (C)

It is a person who expects the benefits of the actions taken

- *Actor* (A)

Person who took the action

- *Transformation Process* (T)

The changes from existing input to a better direction

- *Weltanschauung* (W)

An ideal form of action to deal with and observe problems

- *Owner* (O)

An actor who can stop action

- *Environmental Constraint* (E)

An obstacle in the action environment

4. *Conceptual Models of systems describe in root definitions*

This stage describes the flow and dependence of activities that have previously been defined and described in the root definition. Conceptual models are created using words that will later be needed to describe the activities that must be carried out in defining the problem.

At this stage also a measurement model that includes :

- *Efficacy*

The methods that used in the service to produce the desired output.

- *Efficiency*

A measure of the accuracy of the objectives (effectiveness) of a process or activity carried out. Efficiency can be seen from several variables such as, low cost and time spent in achieving maximum results from existing inputs.

- *Effectiveness*

Appropriate (regarding the target), how much level of benefits can be provided by the use of IT resources that have been invested in the overall performance of the company's operations.

5. *Comparison of models and real world*

This stage compares the recommended model given by the system with real world conditions.

6. *Change: Systemically Desireble, Culturally Feasible*

This stage makes changes that might occur if the model recommendations given by the system are run. All comparisons between real systems and conceptual models will be compared, which things will be changed or not.

7. *Action to Improve the Proble Situation*

This stage describes the implementation or what actions might be carried out as a solution to the problem.

Initially, the SSM approach was seen as an ordinary modeling tool, but after development, the approach has improved as a learning tool and a development tool as an aid in interpreting problems. SSM is a methodology for analyzing and modeling systems that integrate technology (hard) systems and human (soft) systems. SSM is an approach to modeling processes within an organization and its environment and is often used for modeling change management, where the learning organization itself is change management.

3. Discussion

Tourism is a temporary movement carried out by humans with the aim of getting out of routine work, out of his residence. Activities are carried out during their stay at the destination and facilities are made to meet their needs. Tourism lesson is a lesson to get out of the usual situation and this is influenced by the economic,

physical and social welfare of tourists who will carry out tourism activities. Expectations and adjustments are made by residents who receive them and there is a role of intermediaries and travel management agencies acting as intermediaries between tourists and residents in the tourist destination. (Happy Marpaung, 2002: 13). Tourism development can be done by improving or improving the quality of tourist objects or areas by improving facilities and infrastructure as well as improving services in terms of accommodation and transportation and carried out in a structured, orderly and in an integrated system between components of tourism development. Also important in terms of tourism development is the promotion system in the sale and imaging of a tourist destination, tourist attraction and tourist area. The constraints of developing national tourism at this time are that there are still many areas that have not been able to manage tourism potentials well and the tourism management patterns are still conventional so that the management system and information system of sales potential for tourism are not yet able to run well and sometimes unable to compete with the region travel in neighboring countries. Current advances in information technology and the high use of the internet today should be put to good use in terms of managing tourism information so that potential tourists can easily access information about a tourist destination, region or tourist attraction along with all supporting facilities and infrastructure and tour packages offered and the cost and length of time that will be used for travel.

Optimization of tourism potential is not only in the direction of revamping the location and attractions, but must be followed by the use of internet technology in conducting promotions as well as choosing tour packages and booking directly by tourists. The use of information technology is believed to be a very influential factor for the development of the tourism sector. Information about a tourist destination along with facilities and infrastructure as well as other components related to tourism are very much needed by potential tourists in determining the tourist destination. Information can be defined as data that has been processed into a form that has meaning for the recipient. Medium Information system is a system that has the ability to collect information from all sources and use various media to display that information. Even this information system is supported by the availability of information technology, information technology according to Lucas (2000), is any form of technology applied to process and transmit information in electronic form.

Utilization of information technology in tourism development is carried out by inputting data about tourist objects, hotels and lodging around tourist sites, modes that can be used to access locations, events that are often held, cultural uniqueness and local traditions in tourist areas and maps distribution of tourism objects accompanied by instructions on travel routes. The results of this data analysis with all the details are then informed to prospective tourists who are applied in the form of a package of tourist activities. Utilization of information systems in one tourism information system must also provide space to interact between tourists and tourism service providers so that the ease of this interaction will facilitate transactions between the two parties.

At present, the presentation of information about tourism by using the use of information technology is increasing and tourism needs are also higher so that the tourism sector has the opportunity to attract the attention of local and foreign tourists to visit various tours in the city of Palembang. Soft Systems Management (SSM) is a technique that can be used to increase the number of tourists visiting the city of Palembang that can provide benefits for the foreign exchange of the city of Palembang.

Case studies used in the application of some of the techniques described above are attracting local and foreign tourists to Palembang city attractions.

From the explanation above, the seven stages of SSM can be implemented, i.e :

Stage 1 *Situation Considered Problematic*
This stage aims to find out and define the situation and issues to be discussed. These problems include:
- Lack of information provided by the Palembang city tourism department to local and foreign tourists through various media, especially media that use information technology, so that tourists do not know what tourism is in the city of Palembang.
- Budgeting problems have always been a major obstacle in preparing tourism data using Information Technology.
- Not yet computerized, all tourism activities that can hamper the process of tourism data collection are very dynamic so that they need careful handling.

Stage 2: *Problem Situation Expressed*
This stage uses rich picture that aims to represent the current situation, problems that arise, existing conflicts, and the interests of each section. Figure III-1 is a rich picture of a case study raised in this paper.

From Figure 2 it is illustrated that there are still some problems between actors:
- Palembang Government Tourism Office

The Tourism Office needs a system that can help them in presenting information, requires a budget to implement information technology and the process of upadating the data on tourism activities
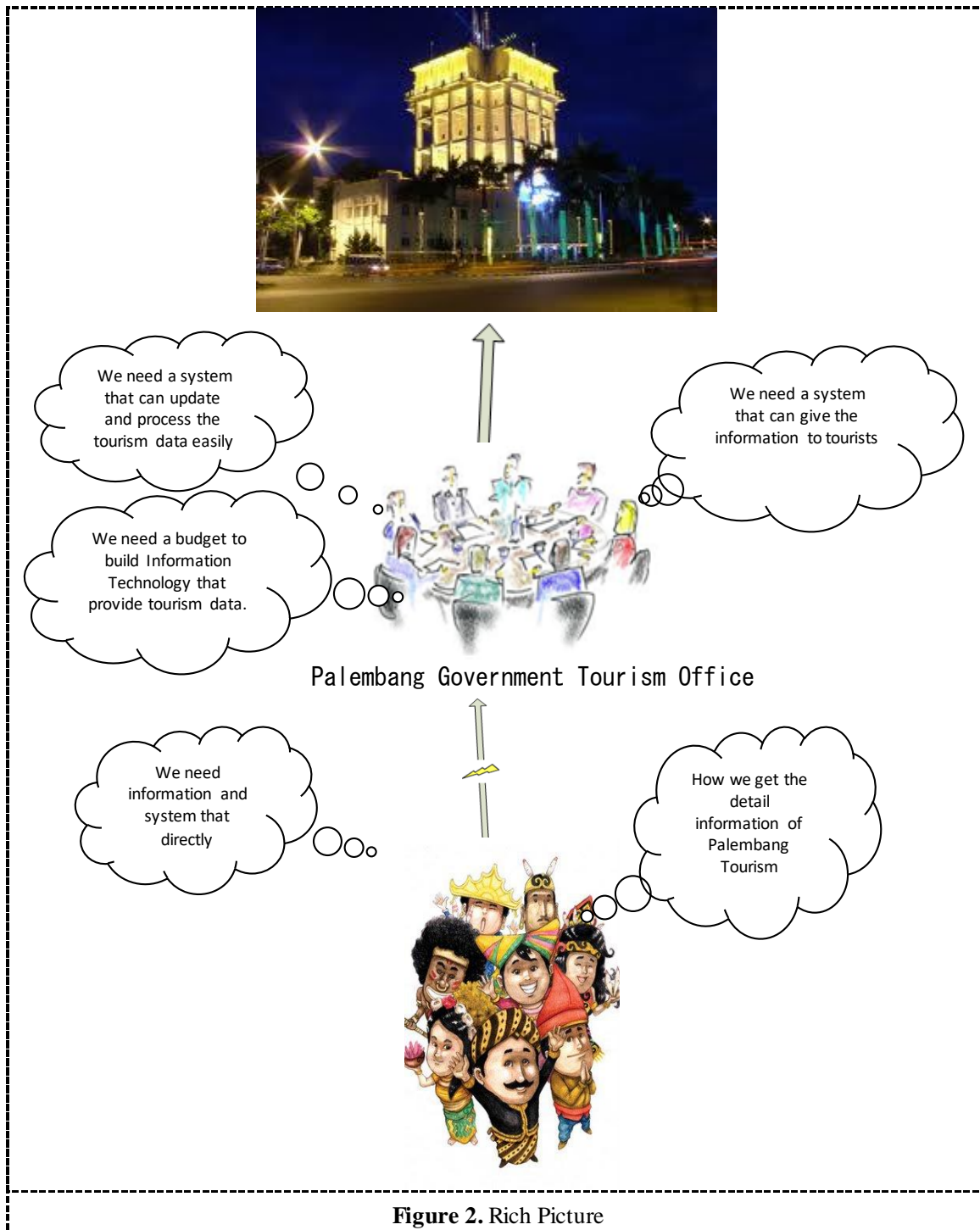- Tourist
Tourists need detailed information about tourism in the city of Palembang.

Stage 3 *Root Definition of Relevant Systems*
This stage explains the problem and also extends the problem using the CATWOE method. The root definition of this case study is as follows:
Application of Information Technology by using Soft System Methodology (SSM) in developing the Palembang city tourism system through the Palembang City Tourism Office, so as to facilitate local tourists The application for permission to open tenans at shopping centers is a service that is owned by the company's management to facilitate requests in producing letters permit for opening tenants by using the role of department staff (fit out department, engineering department, financial and accounting department) and management in examining and approving permits for opening tenants with discipline from the applicant in providing administrative requirements and completeness of payment.

Figure 2. Rich Picture

And the CATWOE method of this case study is as follows :
- Customer (C)
  Local and foreign tourist
- Actor (A)
  Palembang government tourism office, local tourist and foreign tourist
- Transformation Process (T)
  Updating tourism activity in Palembang city → Detail Information of tourism in Palembang city
- Weltanschauung (W)
  Getting detail information about tourism in Palembang city

-   Owner (O)
    Palembang government tourism office
-   Environmental Constraint (E)
    Tourist attraction, culture, art, food from Plamebang City

Stage 4 *Conceptual Models of System Described in Root Definition*
This stage describes each definition made a diagram in the form of activity model diagrams. The flows and dependences of activities that have previously been defined and described in the root definition (Figure 3).

Figure 3. Conceptual Model
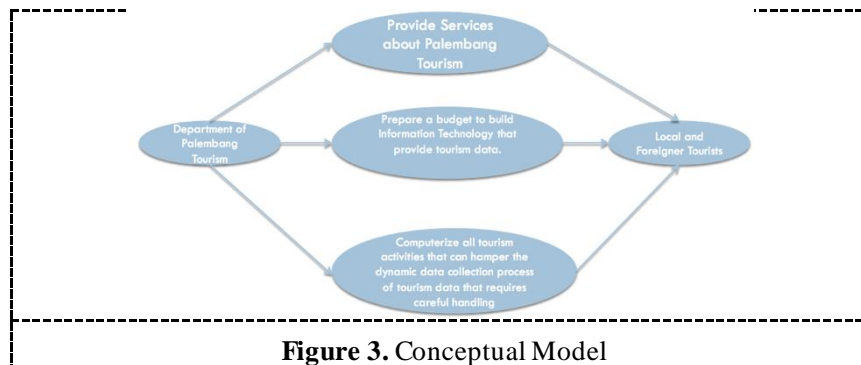
At this stage also a measurement model that includes:
-   *Efficacy*
    The methods used in providing detailed information on Palembang city tourism can produce the desired output.
-   *Efficiency*
-   Efficient use of resources in providing detailed information about Palembang city tourism is minimal due to the lack of budget funds prepared by the Palembang City Tourism Office, existing SOPs are still lacking
-   *Effectiveness*
    The output produced is in accordance with tourist demand, but the level of effectiveness is still low because sometimes it does not do upadating data on tourism activities.

Stage 5 Comparison of models with the real world
This stage compares the recommended model given by the system with real world conditions. In Table 1 the comparison of each process from the conceptual model to the real world will be explained.

Table 1. Comparison of models with the real world

Activity	Real World	Recommendations
Implementing Tourism Technology by Palembang Government Tourism Office. .	Palembang Tourism Office implements the Information Technology in presenting Palembang city tourism information, but sometimes the tourism office lacks of the resources to operate the information technology.	Palembang Tourism Office should conduct training for its staff so that, they can operate and access information technology.
The process of updating tourism data (tourism objects, culture, handicrafts and special food) of Palembang city through the Palembang tourism office.	Palembang Tourism Office does not carry out an informative data collection process that can provide information to tourists through information technology media.	Palembang Tourism Office must prepare a budget to support information technology activities so that through these media tourists know the latest information about Palembang city tourism.

Palembang Tourism Office made a e-tourism regarding Palembang city tourism	Palembang Tourism Office does not have a special website and special software about Palembang city tourism	The Department of Tourism should utilize information technology by creating a special website and e-tourism about Palembang city.
Palembang Tourism Office provides information services to local and foreign tourists.	This process is one of the main processes in attracting the attention of tourists. The obstacle that may occur in this process is the unavailability of information services from the Palembang Tourism Office.	To overcome these obstacles, the Palembang Tourism Office should be provide the services to make it easier for tourists to know about Palembang city attractions.

Stage 6 *Changes: Systemically Desirable, Cultural Feasible*
This stage makes changes that might occur if the model recommendations given by the system are run. All comparisons between real systems and conceptual models will be compared, which things will be changed or not.
➢ *Cultural Changes*
   Changes made in this section are:
   - Training in the use of service system applications correctly
   - Discipline staff to better understand and comply with existing SOPs
➢ *System Changes*
   System modification for adopting real situation in every aspect.

Stage 7 Application of the model in the real world
This stage describes the implementation or what actions might be carried out as a solution to the problem. Actions that might be taken as a solution to the problem namely:
− Develop standard operational procedure for every provided service
− Develop system information management:
   o Tourism Staff: provide information to the tourist, as central storage for recording all tourism activity
   o Tourist: Getting the information about tourist attraction, culture, art and food related to the tourist destination.

4. Conclusion

From the explanation and discussion in this study, it can be concluded that the advancement of information technology in the tourism sector is one of them by implementing information systems in every process of information services provided by the Palembang City Tourism Office. Information systems that contain an integrated set of computerized components aim to collect data, store data, process data, and produce information. The information system can reflect and observe actions in the operating system by processing, recording, and reporting operational transactions and can also support managerial activities, including making management decisions.

In addition, this study also looks at how the application of information technology using Soft System Methodology (SSM) is an effective approach to support Palembang's tourism activities in identifying problems and developing information systems.

The next research that can be done is to apply the results of the analysis stages of the Soft System Methodology method and use the final results as a basis for designing the next tourism information system. Furthermore, the results of the design can be used to build the system until the system is complete and can be implemented.

References

[1] Adrian Small, David Wainwright (2013), "SSM and technology management: Developing multimethodology through practice" *European Journal of Operational Research*, ISSN 0377-2217.
[2] Wenbin B. Liu, Wei Meng, John Mingers, Ning Tang, Wei Wang (2012), "Developing a performance management system using soft systems methodology: A Chinese case study", *European Journal of Operational Research*, Volume 223, Pages 529-540, ISSN 0377-2217.

[3] Philippe Vandenbroeck, Rachel Dechenne, Kim Becher, Marijke Eyssen, Koen Van den Heede (2013), "Recommendations for the organization of mental health services for children and adolescents in Belgium: Use of the soft systems methodology", ISSN 0168-8510.

[4] Mehregan, M. Reza, Mahnaz Hosseinzadeh, and Aliyeh Kazemi (2012), "An application of Soft System Methodology", Social and Behavioral Sciences, 41, pp.426-433

[5] Checkland P. Systems Thinking, Systems Practice, 1999, Wiley, ISBN 0-471-98606-2

[6] Wilson B. Soft Systems Methodology Conceptual Model Building and its Contribution, 2001, Wiley ISBN0-471-89489-3

[7] Miller G.A. "The Psychology of Communication" 1970, Pelican books, 140211411

[8] Forbes, P. and Checkland, P.B. (1987). 'Monitoring and control in systems models', Internal Discussion Paper 3/87, Department of Systems, University of Lancaster

[9] Undang-Undang Republik Indonesia Nomor 10.Tahun 2009. Tentang Kepariwisataan

[10] Marpaung. (2002). Pengetahuan Kepariwisataan. Bandung: Alfabeta.

[11] Lucas, G.F. 2000. Information Technology for Management. McGraw-Hill