Implementation of Group Technology Concept on Tourism Information Application at North Maluku Province

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Abstract

This study discusses the development of tourism information system in context of asset inventory of tourism destinations at North Maluku Province by implementing the concept of Group Technology. Various data related to tourism will be grouped by using classification and coding. Group Technology has several advantages for identifying the various components which are then grouped into a small group based on common component design and manufacturing. By applying the Group Technology would be associated with standardization of design and minimize duplication of the design. Data stored in the database will be easily managed by administrators, and the planning process will more quickly and efficiently. The process of data grouping due to step: a). selecting a number of sample data, b). identify and construct encoding, c). grouping data based on the similarity of tourism, and d). analysis and code examine, to ensure that the data have been grouped according to its code. The result shows that the integration of web-based tourism information system with the concept of group technology can be used to assist manager in data management and information to tourists or visitors.

Keywords: *Group Technology, Tourism Information System, Data Base*

1. INTRODUCTION

1.1 Background

Like a hidden paradise, North Maluku have a lot of natural destinations and a variety of historic sites for tourism. Namely, nature tourism, marine tourism, historical tourism and traditional arts with a unique and characteristic that is not less interesting to other regions. Unfortunately, those potential has not been fully explored.

Nowadays, there are some serious problem faced by Department of Culture and Tourism of North Maluku province. Firstly, lack of a tourism information in order to manage data in complete and in a short time. Secondly, limited of the existing infrastructure in the tourism destination. Thirdly, Information technology system without network and online. Fourthly, data management system based on conventional, in which file-based stored on offline system and without data backup

To accommodate the data and assets of tourism in North Maluku Province, government should have an appropriate method to facilitate the management and search of information related to tourism. One of them through the development of the Information Systems through Group Technology concept. Group Technolgy is a philosophy in which some of the problems are the same, we grouped and produce a single solution to saving time and effort [1].

Using of this methode because it has several advantages to identify the various components which are then grouped into a group based on common component design and manufacturing. By applying this method, the data could be associated with standardization of design and minimize duplication of the design. Data stored in the database will be easily managed by administrators as well as additional data in structure and design of existing ones. Therefore, the planning process will take place more quickly and efficiently.

Considering all the above factors, it is necessary to do the research and development of web-based Tourism Information System, so the public could be easily find out information about tourism and its potential. Besides, transparency in management of assets will be guaranteed without fear of surveillance and control.

1.2 Formulatin of Problems

Based on those information, the formulation of problems are:
1) How to design and built the tourism information system based on group technology concept and how to grouping all about tourism information data in North Maluku Province.

2) How to examine the integrated tourism information system based on group technology concept.

1.3 Objectives

The objectives of this research are;

1) To design the tourism information system based on group technology concept in order to inventory asset of tourist destination in North Maluku Province.
2) To grouping all data about tourism objects in North Maluku Province.

1.4 Outcomes Research

1) As a tools for Department of Culture and Tourism of North Maluku Province to inventarize and manage all the tourism assets for the suistainable tourism management.
2) As a reference to next study for all stakeholders.

2. THEORITICAL BASIS
2.1 Information System

Technically, information system could be defined as cooperation between the components that are connected to collect, process, store and disseminate information to support decision-making, coordination, control, analysis, and visualization in an organization [2].

2.2 *Group Technology*

Group Technology is the philosophy of manufacturing activity. In this case the components with similar could be identified and grouped together to obtain advantages in manufacturing processes and component design [2]. For example, there are a thousand different components. Those components can be grouped into 10 or 15 large groups, which regarded as a family component. Each of those families have the same or similar characteristics in terms of its manufacturing process and design.

2.2.1 Classification Method

Classification methods are used for grouping parts or components into a part family based on the design attributes. There are two ways commonly used to classification [3]:

a) Visual Method
In the visual method, parts or components will grouping based on similarity of geometric shapes. Parts or components grouped by using

a visual method is highly dependent on the decision makers. Therefore, this method could be used in cases where the observed number of components are few in number.

b) Coding Method
In this method, part of components grouped based on:
o Geometry
o Dimensions
o Type of Materials
o Shape of Raw Material
o Accuration of finishing part

By using this coding system, each component will be coded in the form of numbers and letters, which each digit represents the attributes of the parts.

2.2.1.1 Classification and codefication

Classification and codefication is the process of identifying similarities and differences between all components. It connected into a coding scheme, namely the provision of a code or symbol on the component (Fig.1).

Digit	Items		(Rotational Components)
1	Parts		General classification
2	name		Detailed classification
3	Materials		General classification
4			Detailed classification
5	Chief		Length
6	Dimensions		Diameter
7	Primary Shapes and ratio of major dimensions		
8	Shape details and kinds of processes	External surface	External primary shape
9			Concentric screw threaded parts
10			Functional cut-off parts
11			Extraordinary shaped parts
12			Forming
13			Cylindrical surfaces
14		Internal surface	Internal primary shape
15			Internal curved surface
16			Internal flat / cylindrical surface
17		End surface	
18		Non-concentric holes	Regularly located holes
19			Special holes
20		Non-cutting processes	
21	Accuracy		

Fig. 1 Codifications System on KK3 [4]

2.3 Tourism in North Maluku Province

There was several potential of tourism in North Maluku province. Starting with cultural tourism. In North Maluku, there are four sultanate where the form of culture, archeology, history and customs as known as Moloku Kie Raha. Relics of the past from all sultanate could be interesting to tourist destination. On the other hand, in colonization era, The Dutch, Spain and Portugal have the long history in this region. They built the fort as a defense from enemy, and now it become a one of the best tourist destination. The next potential is marine tourism. North Maluku

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Province known as the thousand islands province with more than 3000 km of coastline. The beautiful beaches with marine parks and other types of ornamental fish could easy to find in this province. The other tourist destination is national parks. Aketajawe Lolobata is one of the national park with numerous endemic species such as birds, insects and wood. Besides, there are nature reserve in Bacan Island, Obi, Taliabu and Seho.

3. CONCEPTUAL FRAMEWORK

The conceptual framework of research is a relationship between one concept to another concept of the issues will examined. The concept is an abstraction formed by generalizing of sense or understanding of something.

3.1 Data Grouping Algorithm With Group Technology Concept

Grouping data begins with collecting data on tourism informations and potentials, including natural tourism, marine tourism, history, art and culture, number of hotel, capacity and facilities, and travel agency. The following steps describe of grouping the data in Group Technology Concept.
1. Collecting and selecting a number of tourism in North Maluku Province.
2. Classification and codification of data based on existing data.
3. Drawing up and classifying the data using tourism technology group concept.
4. Analyzing code by examining existing data in accordance with its group.
5. Integrate the results of grouping and coding into the application program.

Figure 2 shows the an example of the grouping structure of data based on Group Technology Concept.
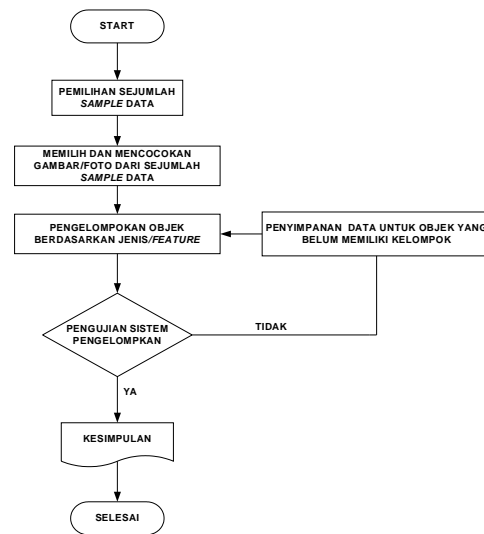

Fig. 2 Algorithm Data Grouping

3.2 Input Process Output (IPO) Diagram

To explain the problem solving concept based on group technology, Process Input Output (IPO) diagram used to clarify the concept. The steps of this diagram are:

▪ **Input:**
Input is processes to put the all information and data to developed models for analyzing procesess. (fig.3). the data will save into Tourism Information System (Simpar).

▪ **Procesess:**
Procesess is a step in the processing of input data using a predetermined method. In this research, data processing doing by step:
  ▪ Grouping of tourism data using group technology concept.
  ▪ Designing the database by grouping structure.
  ▪ Make command (Query) to manage databases using SQL language program.
  ▪ Connect to database system.

▪ **Output:**
The information system include:
➢ The report summary which used by manager level. This report contain:
1 Tourist Destination (name, object, location, accessibility, facility, number of visitor and description)
2 Hotels (name, location, contact person, capacity and range cost).
3 Travel agent (name, location, and contact person).

4 Traditional arts and culture (arts, dance, songs, attraction, and exebhition)

➤ Annual and Monthly report, include:
1. Number of visitors
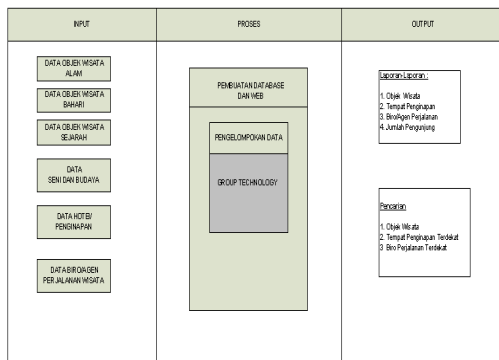2. Country of origin
3. Places to visit

Fig. 3 IPO Diagram

4. MATERIALS AND METHODS

The first stages of this research should be established before designing the system in problems solving concepts. Therefore, study will focused and systematic. Steps of this research shown in figure 4.
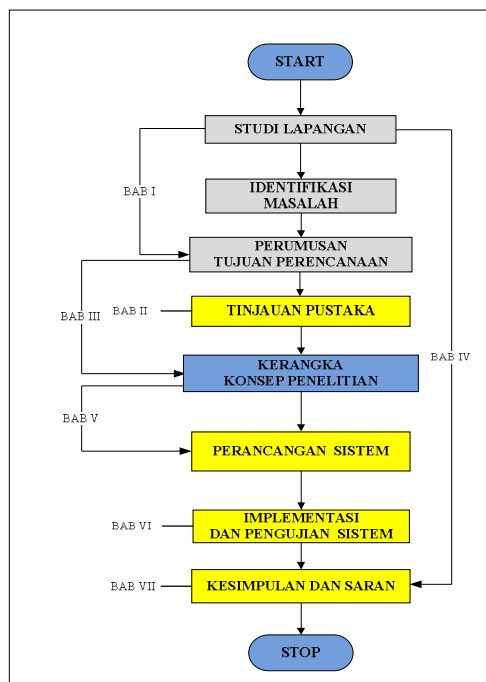

Fig 4. Steps of Research

5. SOFTWARE DESIGN

5.1 Planning

The planning stage is preliminary investigations to plan the new system. It will running to replaces the old system. This system designed to obtain data, updating files, and generate reports that must be known in advance about how organizations handle operations. The stages of this planning includes:

- Software Requirements Identify
- Software Requirements Specifications
- Block System Diagrams
- Data Classification and Codification

1. Software Requirements Identify

All this time, the process of inventory and administration of tourism management held by Culture and Tourism of North Maluku Province still use conventional ways. Lack of Information technology equipment such as computer, internet network and data management are the important problems faced by government.

2. Software Requirements Specifications

This processes needs to explain the software requirements specification that has been previously defined in detail and precisely that will be the basis for the design and implementation.

Definition:
1. *User,* the person who have password to access the system.

Specifications:
User as admin and manager should has put the valid *username* and *password* to login. If they wrong, the system can reject.

Definition:
2. *Admin*, who can input all the data to system. Data about tourism activity, destination object, exhibitions, hotels, travel agents and so on.

Specifications:
Admin should have ability in computer operation and manage all data to system.

Definition:
3. *Tourist or visitor*, who can use this software or system to search data about tourism activity, destination object,

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exhibitions, hotels, travel agents and others.

Specifications:
Tourist could get information about tourism activity, destination object, exhibitions, hotels, travel agents and others.

3. Design of Group Technology Classification

In this step, all the data will grouped and coded based on similarity in tourism information, and filled at Group Technology principles. Data code principles used in this application are hierarchy structure (monocode)(fig 5).

DIGIT	ITEM			KODE
1-2	Lokasi	Kab/Kota	Halmahera Utara	1
			Halmahera Barat	2
			Halmahera Barat	3
			Halmahera Tengah	4
			Halmahera Timur	5
			Halmahera Selatan	6
			Kepulauan Sula	7
			Tidore Kepulauan	8
			Ternate	
3-4	Objek Wisata	JenisWisata	Wisata Alam	1
			Wisata Bahari	2
			Wisata Sejarah	3
			Wisata Seni dan Budaya	4
5	Tempat Penginapan	Klas/Jenis	Bintang (Bintang I, Bintang II, Bintang III, Bintang IV)	1
			Melati	2
6	Biro Perjalanan	Jenis Layanan	Ticketing	1
			Ticketing & Cargo Utara	2
			Ticketing & Cargo dan Paket Wisata	3

Figure 5. Classification and coding System

5.2 Analyzing System

The objective of analyzing system is to specify and to detail the information system needed by organization. It is include the situation recently and related to the problems and what is needed by system.

a. *Entity Relationship (E-R) Diagram*
E-R diagram provide the relationship among entity in Tourist Information system (fig.6)
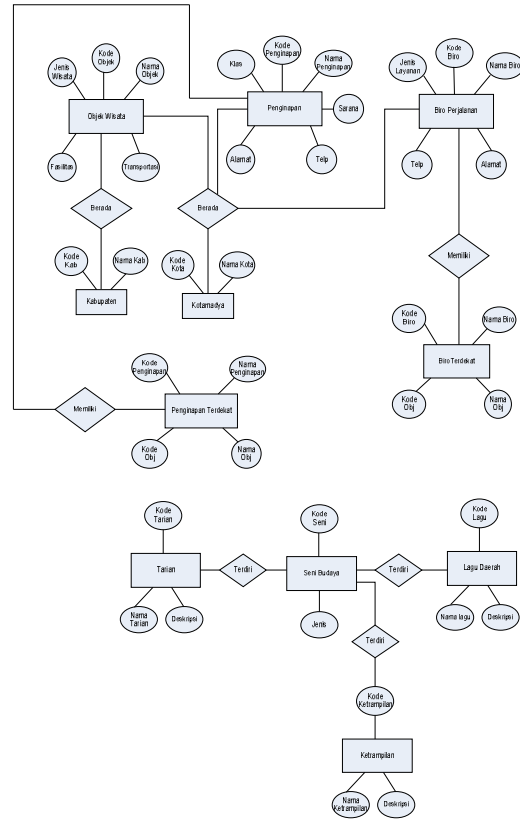

Fig. 6 Entity Relationship Diagram

b. Context Diagram
Context diagram is general review of the system including basic inputs, general systems and output. To make this diagram, the steps are classifying the events based on those data or information that entered and will generated by system and its source objectives. Context diagram is part of the Data Flow Diagrams (DFD), which serves to map the environmental model, which is represented by a single circle representing the whole system. Context Diagram of Tourism Information System (SIMPAR) shown in figure 7.

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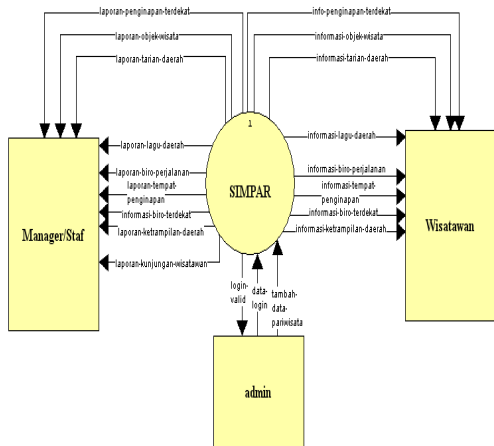
Fig 7. Context Diagram

c. DFD *Level* 1

This diagram is a translation of the context diagram. It shows the important processes in the design of Tourism Information Systems. In the decomposition of the diagram in this level, it saw some repetition in terms of input and output of data in a process. This should be done with the intention to maintain the consistency of the data available on the diagram context.

d. DFD Level 1 for *Officer*

DFD level 1 officer addressed to the leaders to monitor the tourism information system. In this level there are two processes; login process and reports view. DFD level 1 for officer shown on figure 8.
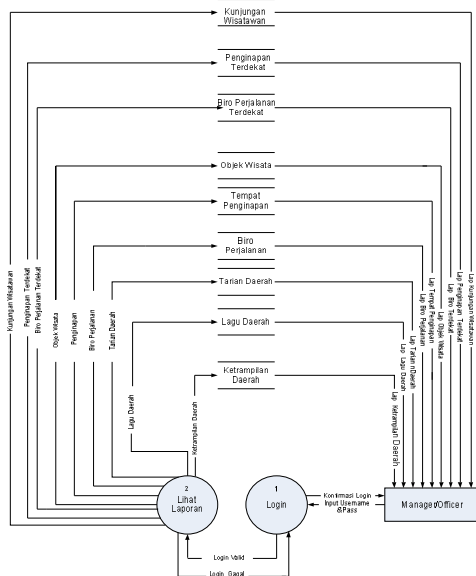
Fig 8. DFD Level 1 for Officer

e. DFD Level 1 for *Tourist*

In this level, tourist could saw the all tourism information in Information System. Tourist should login as a user to get information. Diagram of DFD level 1 for tourist shown on figure 9.
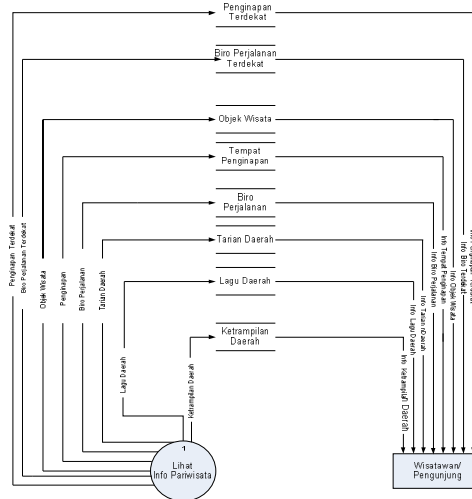
Fig 9. DFD level for tourist

f. DFD Level 1 for *Administrator*

Administrator, who could add and edit all data in Information System. In this level, there are two sub system; add data (fig 10) and edit data (fig 11).
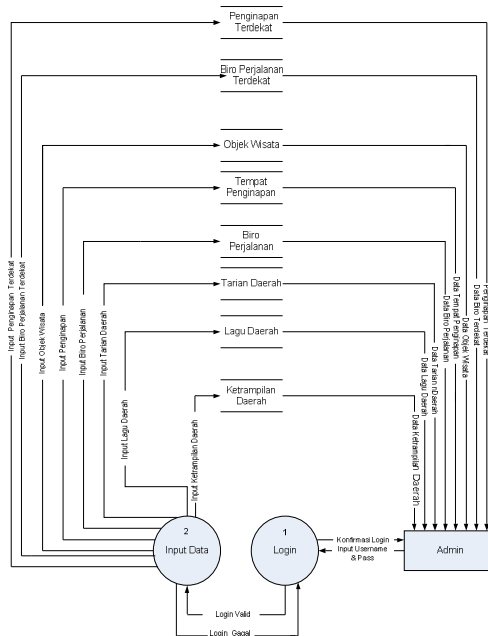
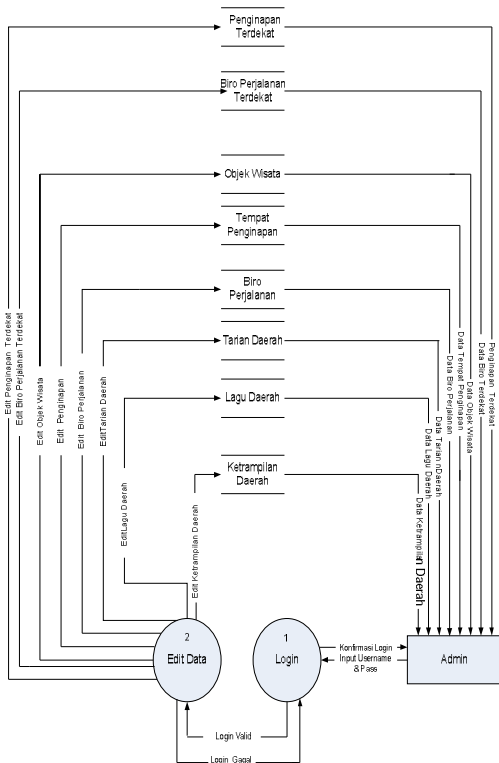**Fig 10.** DFD level 1 for add Data

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Fig 11. DFD level 1 for Edit Data

5.3 Design System

System design stage has a goal to change the model of the information that has been made during the analysis stage into a model according to the technology that will be used for the implementation of information systems. This Information System using a relational database for its implementation, so there are two models created in the system design; Database Design, and User Interface. Database design consists of a logical database design, normalization, and physical database design. While user interface design consists of designing a site map system, designing the form menu

6. Implementation System

Implementation was intended to bring the design to coding software program as the base material. This stage was the implementation of the design has been made for application at the Tourism Information Systems. Here is some form of display on Tourism Information System:

Login Display

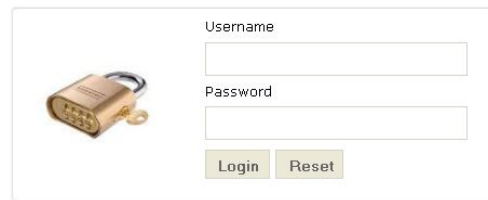Login display in Tourism Information System shown on figure 12.

Fig 12. Login Display

Additional Data Form

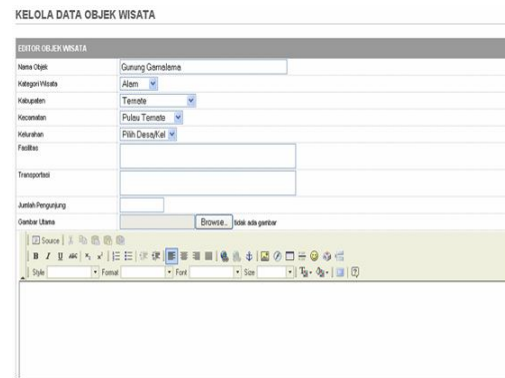This page used to add new information data. And the data will show on tourism menu display (figure 13).

Fig 13. Additional Data Form

Main Menu Display

This page is main menu of Tourism Information System. It is include all of the tourism object, art and culture, hotels and traveling agents (fig 14).

Fig 14. Main Menu Display

Tourism Object Display

In this page, the data about tourism object could be found. It is show the natural tourism destination, historical object, and marine tourism (fig. 15).

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Fig 15. Tourism Object Display

7. Conclusions

1. Tourism Information System with Group Technology Concept could assist management in North Maluku Proipinsi to manage data or areas of tourism assets.

2. The application has been involve important elements in the system of tourism information, such as; Information attractions, hotels, and travel agencies.

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