Development Of Car Rental Management Information System
(Case Study: Avis Indonesia)

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Abstract—**Avis Indonesia has car rental system that is involving the customer's inquiries. They will fill out forms to rent a car. The form will be submitted to the office. After the verification process is completed, car and the driver information will be delivered through the system, along with rental history records. The research aims to build an online car rental system. The researcher used five stages development life cycle including planning, analysis, design, implementation and use, which utilized programming language of PHP 5.0 and version 5.1.30 MYSQL database. Based on the analysis, the information system could increase the time efficiency on average up to two days for delivering the car to customers, and a paper cost savings up to Rp. 750,000 in rental history records.**

Keywords : Management Information System; Online; Car Rental System; Avis

I. INTRODUCTION

The information system designed to more closely manager's needs and the system set up as major computer application area. The Management Information System (MIS) as a computer-based system makes information available to users with similar needs [1]. Manager used the output information. The earlier studies shown that MIS could used to manage car rental, expected to accelerate as well as archiving services to customers better and safer, making it easier when required at any time [2] [3]. The online implementation of management information system provided and supported the customers for reservations, assist management in knowing rental car inventory at a specified time, to process transactions between branches car rental, transportation transaction processing, which supports satisfactory service to customers and support the company's operational processes [4]. Web-based car rental information system increases the customers, and help promotion [5]. The aim of this research is solving the problems that occur in Avis Indonesia; propose development of web-based car rental management information system.

II. BACKGROUND

Car rental system at Avis Indonesia has done by way of the customer register by phone or come directly to the office or Avis stand for registering rental process, so it took a lot of time

and resources required is also increased because each process requires different resources. On rental system that has run in the Avis Indonesia, the company has tried to set up the rental system well. However, due to limitation manual system and only controlled by some parties within the company, thus causing the existing report data becomes difficult to manage. Avis Indonesia as a company engaged in the car rental requires a rental application system that is able to integrate the conventional rental toward the concept of online rental. The concept poured on online web car rental supported with the ability to non-stop access.

III. RESEARCH ISSUE AND METHODOLOGY

The method of build a system in Avis Indonesia was System Development Life Cycle (SDLC) [1]-[6]. The SDLC is an application systems approach to development of information system. The tools of SDLC are using diagrams so it will be easier to understand, its stages related to each other. When changes occur in all phases of the system then it does not repeat again, SDLC phase is simpler.
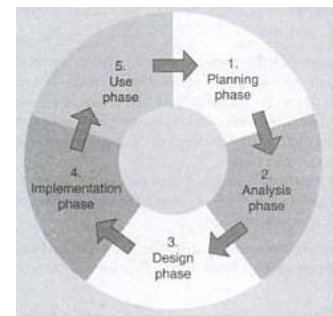

FIGURE 1. THE CIRCULAR PATTERN OF SYSTEM LIFE CYCLE

A. Planning Phase

The first phase for researchers started develops information system which was aims to find the core problems and constraints occur on the running system and to formulate goals of analyzes construction and system development that focuses on online car rental system. In prior planning stage, researchers observed and collected data in Avis Indonesia,

after all data collected, researchers directly conducted analyze**s** system [7].

B. *Analysis Phase*

The researchers analyzed the company's management, workflow, looked for problems occur within the company, car rental procedures and car rental data processing. System analysis aims to find the ideal form of application researcher built, by taking into account various factors of issues and needs that exist on the system as specified in system planning.

TABLE 1. SYSTEM COMPARISON ANALYSIS

Running Business Process	Proposed System	Results to be achieved against the proposed system
Customer's data collection that rented vehicles using bookkeeping process first and then input into computer.	Customer's data collection is using online car rental system application, so the customer data has input directly into the application online.	Customer data arranged neatly, safely, and stored in the database so it can viewed and controlled by the company.
Car rental process by customers is still using rental form in the form of paper media.	Car rental process using web-based online car rental system application which data stored in the database online.	Car rental process will record with a neat, safe and stored in a database so it can viewed and controlled by the company.
Calculation rent income has done by counting rental receipts manually and recording it in rental book.	Calculation rent income is automatically on the online car rental system application and stored in the database online.	Create efficiency of time, performance, effort and cost. Rental data stored neatly and securely in a database so it can viewed and controlled by the company.

C. *Design Phase*

The researchers used several tools to create system design, i.e. process design flowchart for owner and area manager, and Data Flow Diagrams (DFD) car rental system [8] [9] [10].
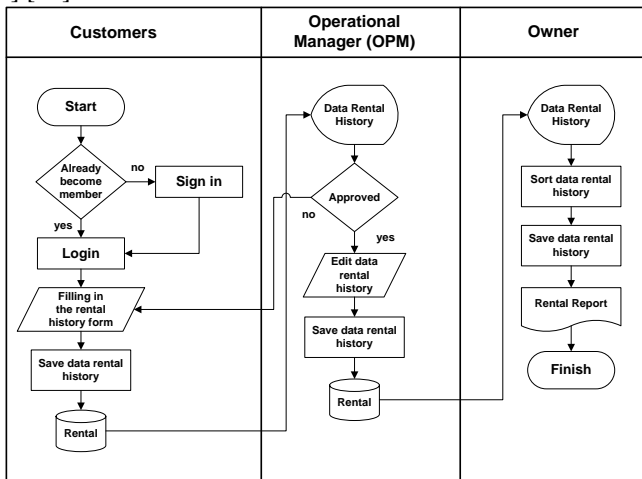

FIGURE 2. ONLINE CAR RENTAL SYSTEM FLOWCHART (OWNER)
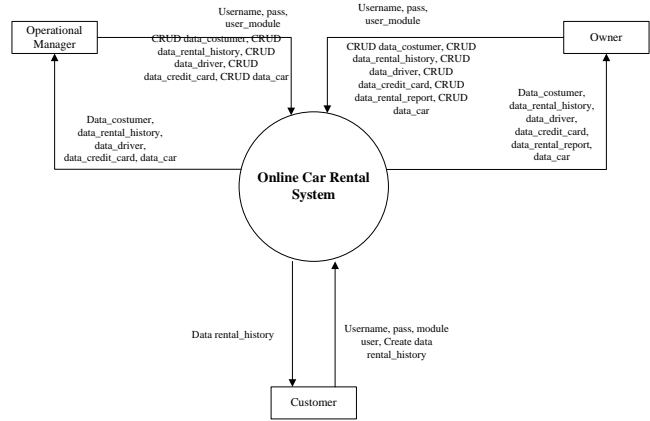

FIGURE 3. DFD LEVEL 0 (ZERO)

Databases Design: after designing the system performed, researchers design databases using the tool of Entity Relationship Diagram (ERD) that describes the relationship between entities that exist in DFD. [11] [12] [13]
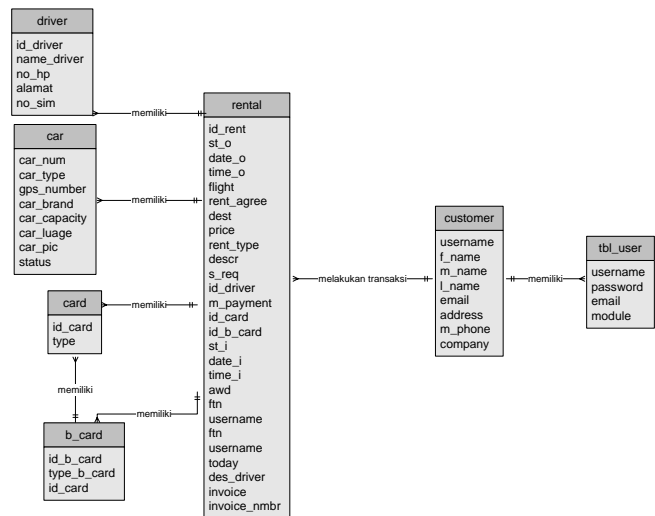

FIGURE 4. ENTITY RELATIONSHIP DIAGRAM CAR RENTAL SYSTEM

The application menu structure design aims to decide the menus needed in application developed, so that the researchers use a tool of STD (State Transition Diagram) which describes the displacement in application menu, so that the menu arrangement of application created will be more structured.
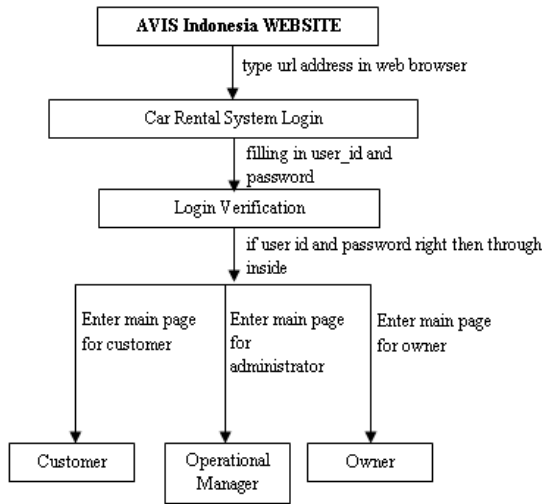
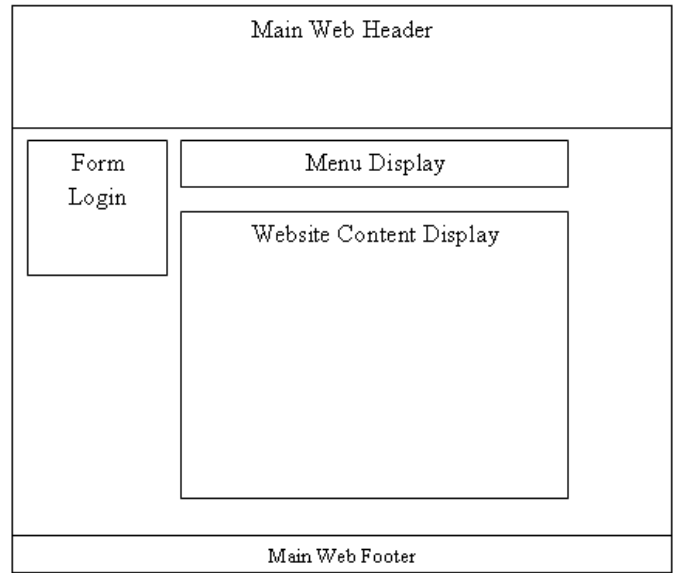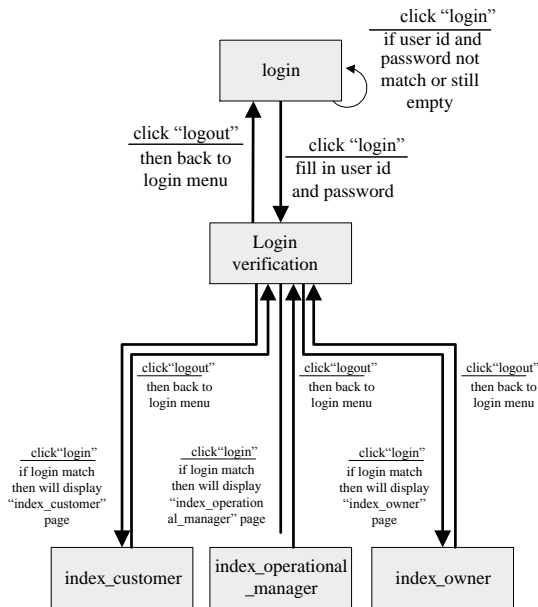FIGURE 5. ENTITY RELATIONSHIP DIAGRAM CAR RENTAL SYSTEM

FIGURE 6. STD FORM LOGIN

Application menu structure design: researchers used state transition diagram as a tool to give layout information, display of the application shown based on company approval and ask to company to fit concept itself (Fig. 6).

Application interface design: the design aimed to find the ideal form of display applications, so help users (user-friendly) in communicating with the system.

FIGURE 7. MAIN WEB INTERFACE DESIGN

D. Implementation Phase

The next phase is implementation. Researchers have planned, to interpret or translate the system application design into programming language that can understand by computer system so the application can run and used. Researchers used software and programming language PHP, MySQL for database and framework in visual web implementation displayed [14] [15] [16] [17] [18] [19].

Hardware Specification
The minimum hardware requirements are:
   a. Server
      1. Single CPU Tower Server
      2. Processor Onboard Intel® Xeon®Processor E3110 (3.0 GHz, FSB 1333, Cache 6MB)
      3. Chipset Intel® S3200 Server Chipset
      4. Standard Memory 4 GB (4x 1 GB) DDR2-6400 ECC 800 MHz
      5. Video type Integrated ATI ES1000 32 MB
      6. Hard Drive 500 GB SATA/300, 10K RPM, Cache 16MB, 3.5-inch

   b. Client/ User
      1. Processor 1.6 GHz
      2. Hard disk 40 GB
      3. RAM 512 MB
      4. Monitor
      5. Keyboard
      6. Mouse
      7. Printer
      8. Modem

Software Specification
- a. Microsoft Windows XP Professional Version 2002 Service Pack 2
- b. Xampp
  Web Browser (Mozilla Firefox)

Network Installation
- a. Network architecture   : Client Server
- b. Type   : Internet
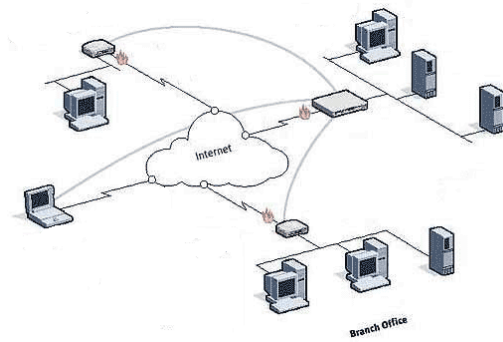- c. Network Configuration

FIGURE 8. CAR RENTAL SYSTEM CONFIGURATION NETWORK

E. Testing and Use

Before the program tested, the program must free from error; free from errors is a necessary testing to find errors that may occur as in the language errors, logic errors and error analysis program. Tests performed on the system Car Rental System application include the entire menu of programs, processes applications, and preparing reports. The tests are known as white and black box testing.

TABLE 2. CAR RENTAL SYSTEM TEST RESULTS

No	Test	Expected Result	Result
1.	Login	Enter to application menu in appropriate access	succeed
2.	Input, delete, and edit Customer data	Customer data successfully stored into database, deleted and edited	succeed
3.	Input, delete, and edit Rental History Data	Rental History data successfully stored into database, deleted and edited	succeed
4.	Input, delete, and edit driver data	Driver data successfully stored into database, deleted and edited	succeed
5.	Input, delete, and edit Credit Card data	Credit card data successfully stored into database, deleted and edited	succeed
6.	Input, delete, and edit Credit Card branch data	Credit Card branch data successfully stored into the database, deleted and edited	succeed
7.	The process of addition and subtraction number each Rental History customers	Rental history data increased when the customer input and decreased when administrator or owner refused or deleted data	succeed
8.	The process of data searching	Data successfully founded and displayed according to what is sought	succeed
9.	The process of data grouping	Data successfully grouped and displayed	succeed
10.	The process of print data	Data successfully printed in pdf	succeed
11.	Logout	Exit from application menu	succeed

IV. CONCLUSION

The researchers make the following conclusions:

a) With web-based car rental management information system, could improve the time efficiency of rental history data transmission after using this application. The time difference in delivery becomes shorter to seconds compared to not using a web application. The delivery has done using transport to headquarter about 3 hours and not immediately shipped, till a few days after the verification process completed.

b) There is efficiency in paper procurement for charging rental history, plus there is no transportation cost for delivery of rental history data, with the web application, the data stored neatly and car rental costs can controlled and monitored by the operational manager and owner thus avoiding the over-budgeting.

c) Data storage which is already computerized will ease the process for company in the data storage, retrieval and report, where all data stored in a database that creates data security and data processing process so that rental data stored neat, clear and not lost or spilled.

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