THE DEVELOPMENT OF ROADRUNNER TRANSPORT CAR HIRE SYSTEM

Name

Student#

Table of Contents

List of Figures

List of Abbreviations

RRT	Road Runner Transport Services
CBD	Central Business District
SDLC	System Development Life Cycle
HLD	High-Level Design
LLD	Low-Level Design
RRT	Road Runner Transport Services

Abstract

This report is the documentation for Road Runner Transport Car Hire System, more specifically, the department of operations. Changes in information technology trends have occasioned the development of the system to overcome the challenges and weaknesses that the current system presents to the organization. Thus, this report aims to establish a secure system with minimal weakness. The process of developing the system commenced with defining the problem and taking an in-depth look into the nature and complexity of the situation and issues at hand. The process of system analysis enabled the identification of the problem areas, in addition to justifying the need to automate the organization's system. The design phase constituted defining, outlining and developing the system regarding identifying the inputs and outputs respectively. After the system was developed, the system was adequately tested and checked for any errors and to ensure optimum performance regarding effectiveness as well as efficiency. Essentially, the automated system managed to meet its objectives, registering a 91 percent success rate. Equally important, there is room for, making further modifications and improvements to enhance the performance and scope of the system to appropriately suit the future growth and expansion of the organization regarding the provision of services as well as structural changes.

The Development of Road Runner Transport Car Hire System

Brief History

Road Runner Transport Services (RRT), is an entrepreneurial engagement encompassing commercial automotive hiring. They hire taxis, self-drive cabs, buses, hearses, trucks, motorbikes, and luxury cars. They also engage in tours and travels by organizing accommodation, information, and transport for both local and international tourists and visitors. They also provide transport to schools that hire buses for school trips and even companies for instance, that are engaging in corporate excursions.

The business was started in 1995 by two partners Mr. Frank Johnson and Dwayne Boniface. The two schooled together and initiated the business after college. As partners, they settled on the name "Road Runner Transport Services" with their logo as an eagle bird perched on a branch to denote efficient and reliable car hire and tours and travels services ready for dispatch. The location of the business is in Manhattan, New York City. Road Runner Transport Services travels located in Alley Grove Drive, approximately 900 meters from Central Park, 5 kilometers from the Central Business District (CBD) of New York City, exactly opposite St. Christopher's Institute. The Head office is on the second floor of Adalyn Court.

The organization serves a wide range of customers. An example of the organization's clientele includes schools, tourists, individuals, companies among other institutions in need transport services. The example of such a situation in which transport services are needed includes school trips, tours, and corporate excursions. Some of their most frequent customers include The Universal Group of Adventures- Los Angeles, California, African Safaris Tourism Club-Ohio USA which is an international tourism club. Other frequent customers entail Spectra International corporations - Washington DC, that use their services to transport their vehicles to transport raw material from the Miami Port for drugs manufactured at their factory in Washington DC. The organization is currently utilizing a manual system to implement procedures in the operations department. The management sees computerization of this area as a vital step towards higher efficiency and productivity.

At the head office, there are several clerks, secretaries and accounts clerks. The organization also has drivers who are classified into Novice, Amateur, and Senior depending on the experience levels at the time of employment. These classifications are subject to upgrading as

years pass by and they earn experience. The classifications determine the range of daily rates of payment and commissions.

Description of Current System

Road Runner Transport Services currently uses a manual system with the aid of electronic equipment like calculators to conduct most commercial transactions.

The manual operations entail a customer calling the help desk and ask if a vehicle with specifications he prefers is available. The help desk clerk calls the reservation clerk to check whether there is such a vehicle while the customer is on hold.

The reservations clerk then scans through the conducted transactions and handwritten available cars forms. A vehicle that is available for rent is deemed so if there are no forms or records, such a vehicle has been rented or in bad condition. If a vehicle with the specified specifications is available, the customer is asked to come to the office, and if not, he is advised on a viable option. If the customer accepts the option, then the procedure of renting the vehicle commences. Else, the customer may be registered for another transaction at another time, or the whole procedure may as well be terminated.

The customer can also come and collect such vehicle details personally without having to call. This is an extremely tiresome and engaging process to effect a transaction since, confirmation of vehicle details involves physical searching for forms, reading through the forms and filing them in folders. Viewing of vehicles also involves having the parking lot attendant go to the parking lot and collect additional features, which takes more time. The customer then is shown to the parking bay where he examines the available vehicles. This is done by the parking attendant who is an employee of Finch Travels. The customer examines the vehicle features like color, make, horsepower, a number of doors, and maximum speed.

The attendant then reports the customer's choice to the main transactions clerk. Before entering into a contract, the customer is required to read, accept and sign the terms of the contract. An individual customer is required to submit a letter of recommendation suggesting suitability for transport services and a statement of account to assure of his capability to go through with the transaction. The customer must also be aged above 22 years.

Registration of the customer entails his/her details including name, telephone number, area and address of residence-house/plot number (where applicable), telephone and mobile number, date of birth (for age).

Life Cycle Approach and the V-Model

There is a wide range of system development life cycle (SDLC) that are applicable to software system development and engineering. As it pertains to the designing and development of the proposed system for Eagle Transport Services the lifecycle approach to be applied is the V-model. In software development and engineering, the V-model refers to a development process that is widely considered as the descendant or an extension of the waterfall model. As opposed to proceeding downwards in a linear manner, the process steps involved in the V-model take an upward bend after the coding stage to form a V-shaped process (Bennour et al., 2002). The differentiating factor between the waterfall model and the V-model is the manner in which the models are presented, in addition to the emphasis placed on system testing. As such, it implies that in the V-model, system testing is conducted for each of the corresponding phases of development. In other words, for every stage of system development, there is a testing phase that is directly linked to that stage as illustrated in the figure

below.

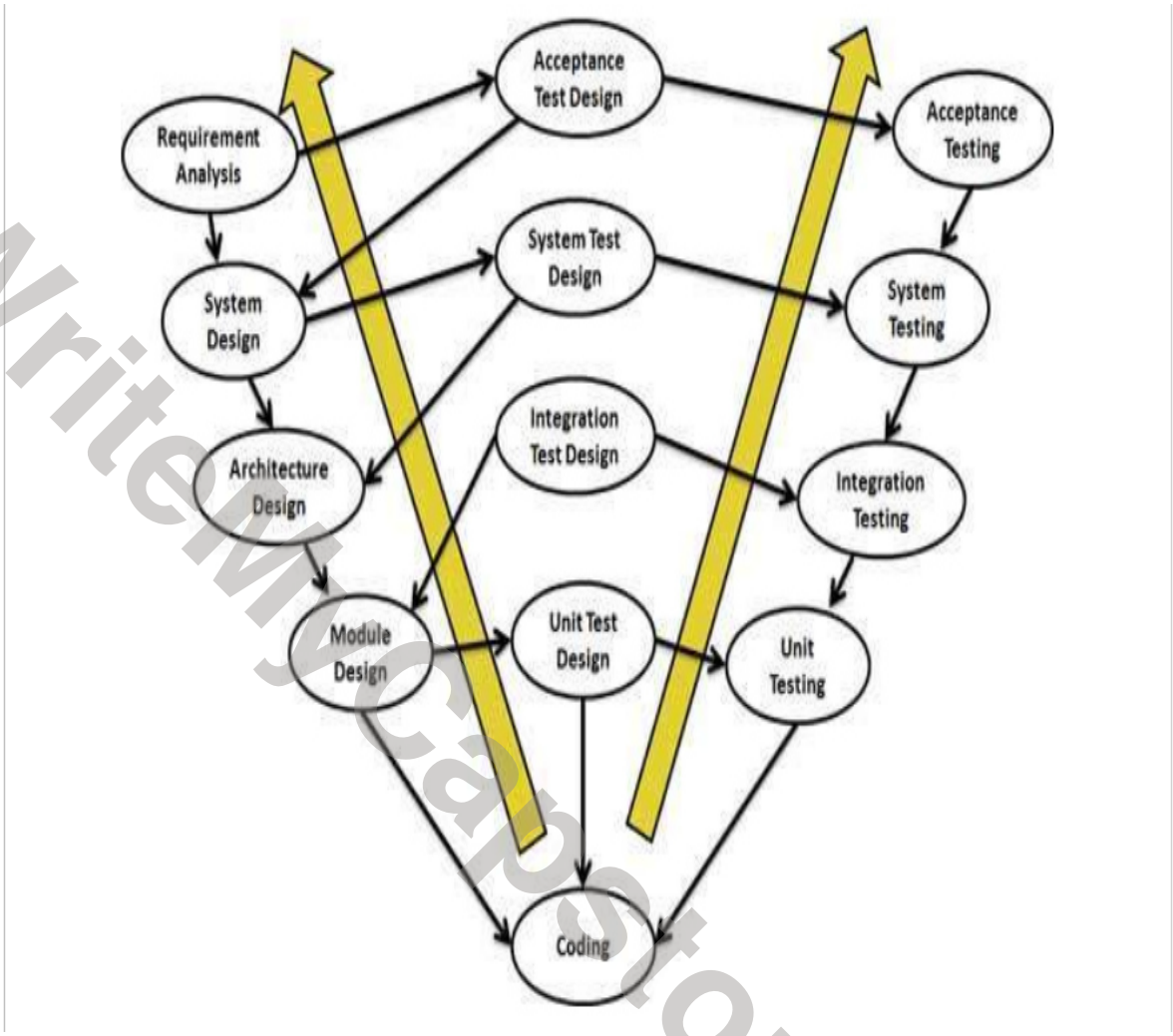

Figure 1: Stages of system development and associated testing phases

The verification phases of the V-model include:

Business Requirement Analysis

Usually**,** this is the phase that begins the system development life cycle. The system or product requirements are defined and outlined from the perspective of the client. This phase is characterized by detailed communication between the client and the developer to determine the expected and exact requirements. The acceptance test design planning is also undertaken and the business requirements applied as an element (or input) of acceptance testing.

System Design

This phase primarily involves designing the entire and complete design of the system. System design constitutes gaining a detailed insight and perspectives about the system, in

addition to getting to understand and outline the hardware as well as communication setup for the proposed automated system. This phase also involves establishing the strategy for testing the system by the design of the system. Performing this at the initial stages of development creates more time for the actual performance of test later.

Architectural Design

In this stage, the systems architectural specifications are defined, outlined and designed. Several technical approaches are proposed and recommended, and the final decision made based on financial and technical feasibility. The system design is further split down into modules based on the various functionalities. This is also called high-level design (HLD). Communication and the transfer of data between the system's internal modules and the other external systems in the outside world are outlined, defined and understood; after which this information is used to develop and design integration tests.

Module Design

This phase facilitates the low-level design (LLD), which provides a detailed design regarding the system's internal modules. This phase ensures that all modules and components, both internal and external that make up the system are compatible with each other. Unit tests facilitate the elimination of faults or errors during the initial stages of development. Unit tests are designed during this phase according to the internal module designs.

Conceptual Design of the System

Problem Definition

Road Runner Transport Services (RRT), is currently using a manual system with the aid of electronic equipment like calculators to conduct commercial transactions. The organization's operations are carried out manually throughout firm except for the occasional use of the handheld electronic calculator. However, processes that deal with recording of information and storage of records are done using the traditional using pen and paper for the recording and cabinets for storage of records. As such, the need to develop an automated system for the organization is inevitable, to facilitate the enhancement of data security as well as processing capabilities, in addition to saving the time consumed executing these tasks.

Other weaknesses of the current traditional manual system include:

Processing speed: The system is characterized by inefficiencies occasioned by extremely low data processing that heavily relies on human capabilities, in comparison to automated systems.

Operations such as filling client details, vehicle details and transactions take more time since is done by pen and paper writing, and a lot of redundancy is involved where customer details have to be rewritten again with the vehicle details on the transaction form and receipts. This increases the time taken to effect a transaction and clients may be kept in long queues when demand is high, therefore, throughput is below par.

Data Storage and Retrieval: The current system is costly to the organization as it consumes a lot of papers for the recording of transactions and not mention the large spaces allocated for cabinet that store paper files containing customer, vehicle and transaction details. Even worse, is that the organization is forced to continually keep looking for additional space for the cabinets due to the accumulation of papers and files stored in them. Creating data backup for records comprises of taking photocopies of the documents, thus consuming more resources such as human capital, paper, and ink. The retrieval of data is also tiring and cumbersome since it involves physically and manually locating the required document through a large pile of paperwork stored in the cabinets.

Accuracy: the current system is prone to human error and also intentional malicious modifications of crucial transactions documents. This also results in substandard business operations such as undercharging and overcharging of clients, which makes auditing of the firm a challenge.

Data Security: with the current system in place the security and safety of the organization's financial, operational and customer information is left exposed to prying eyes and vulnerable to being compromised by malicious elements. The current security features rely on the keys and locks to ensure the safeguarding and protection of data yet these features can easily be compromised by external as well as internal forces

Data Redundancy: the current system is also highly characterized by the redundancy of data in the sense that data is recorded and stored multiple times and therefore compromising the integrity of the data stored due to repetition.

These problems need to be solved for the organization to maximize throughput, profits and customer confidence as well as minimize sub-optimization.

Feasibility Study

Feasibility has defined the assessment of the practicality, viability, and possibility of a proposed project or plan about the current system taking into account the economic, technical and operational factors.

Technical Feasibility

The feasibility study was conducted with the primary objective of ascertaining if the staff and stakeholders of organization support the existing system. As such, the following was found:

- The existing system lacks an automated data backup features. As such, there is a high risk of data loss since the transaction data is stored manually in cabinets
- The existing system lacks a database system developer to facilitate the automation of the current system to improve the effectiveness and efficiency of the system. Therefore, there is an urgent need to contract or employ a system developer to maintain the proposed system.

Operation Feasibility

The operational feasibility study was conducted with the core objective of ascertaining if the existing system had the support of both the staff and other stakeholders who utilize the current system. The study established the following:

- The operation of the existing system needs a significant number of employees to execute operational tasks such as making customer bookings, making vehicle reservations and dispatching of vehicles, and issuing notifications to clients.
- It was found that processing of billing information to clients was conducted manually. Only a small number of staff were computer savvy or computer literate, as such the manager was tasked and burdened with the evaluation of bills processed by the Finance department.
- The current system is time-consuming thus it slows down the process of generating reports and consequently slowing down the rate with which decisions are made. This can be attributed to the fact that the quite a significant amount of time is spent in physically and manually analyzing the records stored in the cabinets which makes it difficult to access files.
- The existing system is uneconomical. Many tasks are delegated to some staff members
- It consumes many resources like stationeries, time, and labor cost.
- The proposed system will be much more economical. It will require fewer number personnel and fewer procedures of implementation.

- The billing section had seven employees who are data entry clerks, collection and dispatch clerks.

Preliminary Design of the System

Requirements of the System

- System requirements refer to the resources and tools that must be in place to facilitate the effective and optimum functioning and operation of the proposed system. For the system to perform as discussed above, the following will be required:
- **Supporting software**: this refers to the platform through which the proposed system will run or rather be operated on as well as other supporting environments and database systems that will facilitate the running of the database such as Oracle or MS Office Database.
- **The hardware:** this refers to the physical components and devices on which the proposed system will be installed for use and operation. The hardware will also provide storage space platforms, as well as provide the input and output features of the system.
- **Design Requirements**
- The design requirements for the proposed system are outlined below:
- **Forms** are to be utilized as an avenue for inputting the customer information or details for processing and storage into the new system, in addition to billing data. The forms will also be applied to the interface for the modules that collect data to the new system
- **Flowcharts** are to be utilized in depicting the flows of various organizational activity in the system. In addition to illustrating how activities flow, they aid in designing and developing the new system.
- **Tables** also referred to as relations will facilitate the storage of different kind of records in the system.
- **Reports** serve as an output avenue of output either in hardcopy or softcopy.
- **Queries w**ill facilitate filtering of data for particular needs.
- **Databases w**ill provide a platform through which all data will be stored.

Detailed Design of the System

- The detailed design specification outlines the inputs required to process data and the required outputs required.
- **Required Inputs**
- Client's information to aid in distinguishing corporate clients from individual clients.

- Vehicle details to determine the type of rental costs and vehicle specifications.
- Driver details to determine the driver availability and charges.
- Payment details to aid in generating of bills to customers
- **Outputs Required**
- Clients' invoices and payment details
- Vehicle details
- Client details
- Driver details
- **Processing Required:**
- Calculate number of days the vehicle is to be rented
- Calculate the total rental cost by multiplying the number of days by the rental cost of the particular vehicle/s
- Calculation of bill to be issued to a customer in addition to the driver's cost
- Determination of the total number of clients the company has.
- Determination of the total number of vehicles the company
- Determine available and busy vehicles, rented clients, vehicles and busy drivers.
- Determine privileged customers by checking the number of rentals a client has conducted.

Flowchart of Proposed System

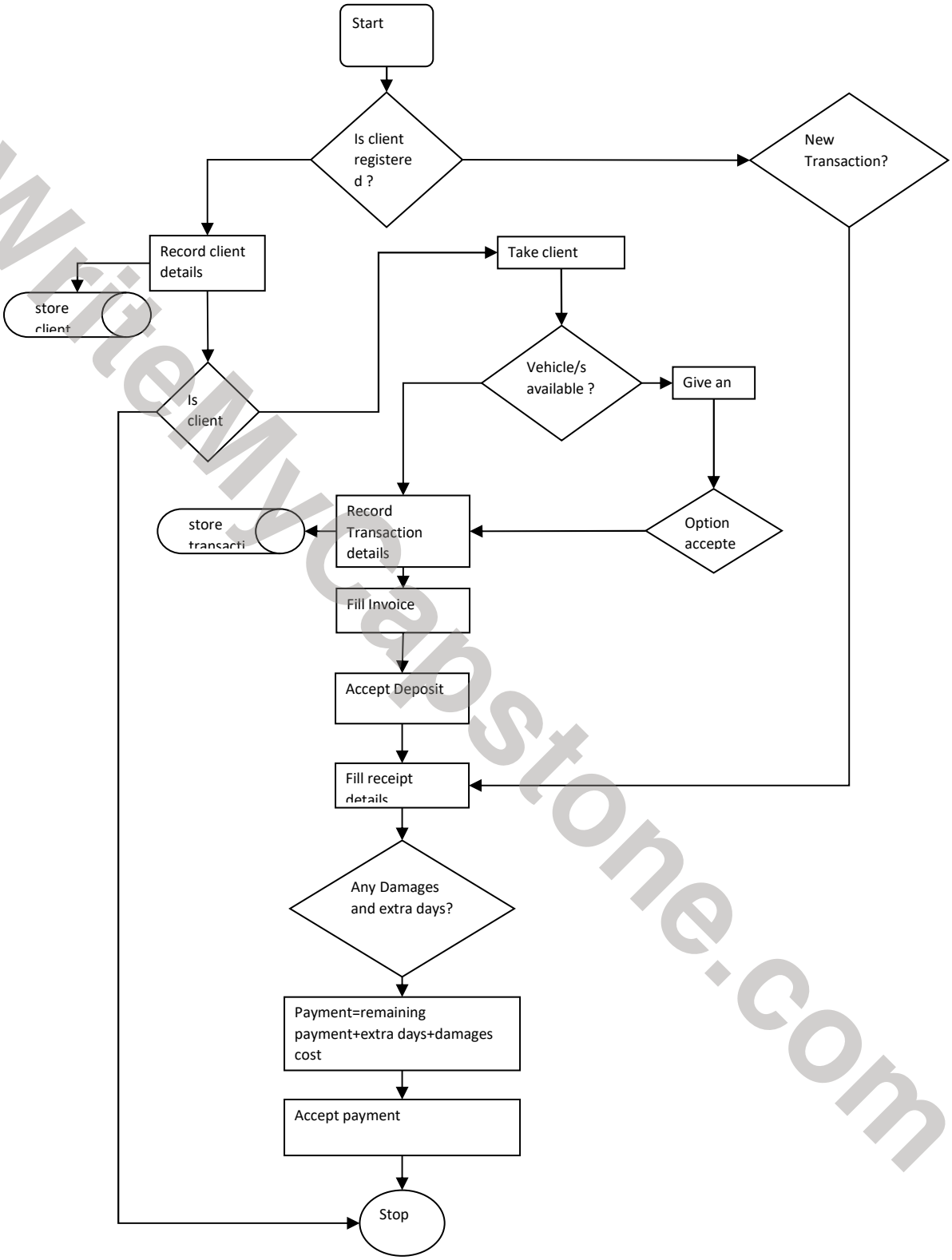

Figure 2: Flowchart of proposed system

Evaluation and Feedback

The limitations associated with the proposed system include:

1. The proposed system was not developed facilitate conducting of e-commerce transactions
2. The features of the system are restricted to the operations department of the Road Runner Transport Car Hire Limited and have a less detailed incorporation of financial calculations details which have been deferred to the Accounting System, for instance, drivers' overall payments (only commissions are calculated in the Road Runner Transport Car Hire System.

The system can be upgraded and modified in future to:

Communicate and integrate with the Accounting system to allow for direct transfer of generated data to the later for use in the accounting department

Enable clients to perform e-commerce transactions and inquiries through the internet via Car Hire System.

In future, the system can be enhanced with upgrades to generate accurate, presentable and more reliable reports and output.

Conclusion

In conclusion, there are numerous reasons why the development of Road Runner Transport Car Hire System can be termed to be successful. Firstly, it is apparent that the system can help to improve the performance and efficiency rates. Compared to the manual system, this system reduces the time required to complete a single transaction. Additionally, the system helps to reduce the space required for the storage of data since instead of using the traditional file cabinets, computer hard disks are used. These drives are small in size and occupy little space. What is more, since the system incorporates user and administrator accounts, the level of data security is kept high since it is not easy for unauthorized individuals to access and modify the system database. Equally important, there is a reduced number of required employees since there will be no need for a parking attendant. Visitors can be directed based on the vehicle details displayed on the computer screen. The number of clerks will also be reduced since a single machine can attain an output that is thrice what a single clerk can perform over the same time. Finally, the system is more precise and accurate since all calculations adhere to a specific code which is tested. Before the system processes the data, the input figures are validated first. Therefore, the output is highly reliable since the system automatically rejects invalid data. Thus,

the computerized system has offered a solution to the challenges highlighted in the problem description section.

References

Bennour, I. E., Abid, M., & Tourki, R. (2002). Hardware/software co-verification: Models and methods. *Systems Analysis Modelling Simulation, 42*(9), 1391-1417.

Annexures

From the study, it is apparent that although the system will require much investment regarding funds for research and skilled workforce, it will be beneficial in the long run as it will help to cut organizational expenditure. It is also apparent that adequate time should be allowed for the analysis, testing, and system implementation. It is also notable that a computerized system will facilitate efficient management of human resources within the entity because less stationery will be required. Enough time is required for analysis, design, testing, and implementation of the system. The main challenge faced by the analyst is the development of the system and application of the SE tools in a real-life situation. Additionally, the analyst needs to be experienced in the generation of crystal reports from database tables.