CHAPTER 6

PRELIMINARY INVESTIGATION

6.1 Overview

The purpose and objective of a preliminary investigation is to assess and evaluate the needs and requirements for system development. This is the prerequisite of a new system development. The main objective of this stage is to ensure that the new system can help to achieve the organisation's goals and objectives, after considering the organisations' different resources. It is also help to determine the necessity of developing a new system and provides an overview of the old system to the developer. This stage is basically the process of collecting information that will permit the management to evaluate the feasibility of a proposed system project. (James A, Senn, 1989)

Tabulated below are the stages that the developer should perform.

- ❏ Clarify and understand the system's request
- ❏ Define the scope and constraints
- ❏ Assess the costs and benefit
- ❏ Examine the technical and operational feasibility

6.2 Clarify and Understand the System's Request

An important objective of a preliminary investigation is to identify the reason of the system request and all the related problem of the old system. Tabulated are the reasons for system request:

❑ Capability

The capability of the current system, including the processing speed, cost effectiveness, and rate of efficiency, which often affect the productivity and profitability of many businesses (Christopher Martin & Philip Powell, 1992). Remote monitoring system is suitable for businesses that have many branches or outlets in different places. If the current system is not able to monitor a few locations at the same time, then remote monitoring system would be the right solution. As mentioned earlier, more and more organisations are using remote monitoring system to monitor their business i.e. Burger King restaurants.

❑ Control

In some organisations, the information processed is often highly sensitive. If important or confidential information leaks, it may lead to serious business loss. It is therefore, important to safeguard information and prevent unauthorized people from accessing this information or enter into premises. Organisation may propose a system to ensure better security. Examples are password, validation system, authentication system, *CCTV*

surveillance system and so on. Remote monitoring or CCTV is a common security system tool.

❑ Communication

Globalisation has recently become part of many organisations' development strategy. In order to achieve successful globalisation, communication is the vital tool. Effective and efficient ways of communicating with the subsidiaries located worldwide is essential for maintaining good business levels and achieve better profit levels. Remote monitoring system is a common international communication network currently used by some multinational corporations. This is where Remote Monitoring system can help to improve the communication amongst management levels. The real time situations can be viewed by the organisation's management regardless of where they may be around the world via the remote monitoring system. The management can now provide immediate feedback or even give step-by-step instructions in emergency cases (Christopher Martin & Philip Powell, 1992)

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❑ Cost

In a typical manufacturing industry, monitoring the amount of materials, purchased for production is an important task. Many organisations, particularly those in this industry, require computerised systems to monitor

the overall running cost. This is where remote monitoring system comes in to reduce cost. By using the remote monitoring system, the management level can find out who is "sleeping on the job," or wasting time on unproductive tasks by reviewing their daily activities from time to time. Poor time use is as costly as theft (Christopher Martin & Philip Powell, 1992)

□ Competitive advantage

In many organisations, information technology has become part of their strategy to remain at a competitive advantage. Organisation may be able to satisfy their customers by manipulating customer databases when providing better prices, unique services, and even delivering unique products to regular customers. With the remote monitoring system, management is able to receive up to date information at the right time and come out with strategies to improve the business (Christopher Martin & Philip Powell, 1992).

The main reason for the research and development of this project is to provide security via the control of the information process, observation of the manufacturing process, to increase employee productivity and possibly reduce the cost of lost.

6.3 Define the scope and constraints

After initiating the system, the developer must determine the size of the project and have a concise boundary of the system.

The developer then decides to develop a working model of the remote monitoring systems; with three major functions:

- Using computer network (LAN/WAN) for remote monitoring.
- Using dial up modem for remote monitoring.
- Using Internet for remote monitoring.

While defining the scope of the system, it is also essential that the developer identify the system's constraints.

Tabulated below are some the constraints of the proposed system.

- Hardware – The CCTV camera is a must requirement as direct communication between the particular CCTV camera and the computer may be difficult.

- Transmission media – the system requires a transmission media faster than the normal low bandwidth transmission media, as this may slow down the system.

- Software – the system must able to accept input from the different remote sites.

- Time – the system must be completed by 30 April 2002, as there is a time constraint.

- Cost – the system requires additional tools and technique, the development cost may be very high; for instance, the cost of purchasing the camera.

- Skill and technique – the developer may not have enough experience and technical skill to develop a complex remote monitoring project.

6.4 Access the cost and benefit

In this step, the developer has to estimate the budget and resources to be invested to develop the Remote Monitoring System, based on the scope defined earlier. Tangible benefits such as number of man-hours reduction, cost effectiveness and higher profit. Intangible benefits however, are more difficult to measure or unable to measure; for example, give worker more job satisfaction, the improvement of security level and control and providing a safe environment for workers.

Below are some of the tangible and intangible benefits that this system is able to offer.

- ❑ Improve security control

- ❑ Prevent employee and customer theft

- ❑ Reduce cost of losses

- ❑ Better use of employee's time on the Job

- ❑ Reduce Workman compensation costs

- ❑ Reduce Armed Robbery and Break-in Costs (Kenneth E. Kendall & Julie E, Kendall, 1992)

6.5 Examine the technical and operational feasibility

Business is like an organic system, it needs to constantly improve and make changes to meet the new needs of the market. Information technology is one of the many means to help an organisation meet these needs. The developer has to analyse the acceptance level of the proposed system within the current technology and business operation. (James A. Senn, 1989)

6.6 Required tools and technique

In order to complete this project smoothly, the developer has to identify the various hardware and software that would be required in order to develop this project successfully.

6.6.1 Basic hardware requirement

Listed below are some of the basic hardware requirements for this project.

- ❑ Computer - A Pentium 200 MHz computer with 24MB of RAM. The computer is used to replace the digital video recorder. All images will be recorded into its hard disk.

- ❑ Universal Serial Bus (USB) Camera - USB camera is used as a substitute to the actual CCTV camera because it is relatively lower cost compare to actual CCTV camera.

- ❑ Network interface card (NIC) - The NIC card is used for data transmission within the computer network.

- ❑ Hub - Hub is used to connect two or more computers within computer network.

- ❑ Modem - Modem is used in the dialling up connection to the Internet for data transmission.

6.6.2 Basic software requirement

Stated below are some of the basic software requirements for this project.

- ❑ Microsoft Windows NT4.0 - Windows NT is used for network operating system, Windows NT provides network management for server and client

◻ Microsoft Visual Basic 6.0 - This is the main development program that would be used for this project. It is user friendly and suitable for fast system development.

◻ Microsoft Internet Information Services (IIS) - This is a Software service that supports web site creation, configuration and management, along with other Internet functions. Services include Network News Transfer Protocol (NNTP), File Transfer Protocol and Simple Mail Transfer Protocol.

◻ Microsoft Internet Explorer - With Internet Explorer and an Internet connection, allows one to search and view information on the World Wide Web.

6.7 Types of Methodologies

There are various methodologies available. Example of some of the most popular methodologies available today include:

◻ Waterfall model

This model suggests a systematic sequential approach to software development that begins at the system level and progresses through analysis, design, coding, testing and maintenance (Jerry FitzGerald & Ardra FitzGerald, 1987).

❑ Prototyping model

This model is used in addition to the basic fact finding method. The developer starts off by producing small workable segments of the product (that is the prototype) for the user to try out. With the prototype, the developer will be able understand the probability of approval by the potential clients of the proposed product. This model is iterative in nature (Jerry FitzGerald & Ardra FitzGerald, 1987)..

❑ Rapid Application Development (RAD) model

This is a linear sequential software development process model that emphasizes on an extremely short development life cycle (Jerry FitzGerald & Ardra FitzGerald, 1987).

❑ Object oriented model

Use of object oriented technique rather than systematic sequential approach (Jerry FitzGerald & Ardra FitzGerald, 1987).

6.8 The reason for choosing prototyping methodology

From all of the options stated above, the developer chose the prototyping model because:

❑ Requirements Not Clear

Just as there is a time constraint, the information the developer has managed to collect is limited. More time is required to collect the necessary data, as the developer has not had prior experience in developing a CCRTV.

❑ High cost

Developers create prototype to test certain characteristics of the final product in order to see the features that need to be improved. This is also more economical than creating a model, therefore this is what the developer has chosen to do here.

❑ Requirement Needs Evaluation

Modification should be made in the early stages. This way, there would be no waste of time finance, material and other intangible resources. This also provides the users with a better view of the system.

❑ Time Constraint

In completing this final project, time constraint, can be resolved using the prototyping model, however, this may prove to be costly

□ High Risk

As this is the first Remote Monitoring project for the developer, the simulation model will helpful in helping to identify the risks involved in the early stages.

□ New Technology

The system relies on external devices such as CCTV camera, modem and network data communication, all being reasonably new technology, therefore proper communication between these external devices is one of the major risks and challenges for the project.