Developing a Decision Support System for Integrating the Operations of a Business Enterprise

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An internetworked Business Enterprise enables managers; business professionals, teams and workgroup to electronically exchange data and information. It also helps the decision making group to formulate the decisions from various dimensions by integrating the information gathered from various levels of organization. In this study I concentrated on developing a system that deals with enterprise wide support. First attention is given to top executives, especially for their role in discovering problems, or trend that may create problems as well as in identifying opportunities .Second attention is given to decisional situation involving many decision makers who may be in different locations. Finally the Enterprise Resource Planning (ERP) system that integrates all the routine transaction processing is discussed.

Keywords: DSS, SDLC, Entity**.**

1. Introduction

A major role of ISs applications in business is to provide effective support of a company's strategies using IT to develop products, services, and capabilities that give a company major advantage over the competitive forces it faces in the global marketplace. Strategic information systems support or shape the competitive position and strategies of a business enterprise. So a strategic information system can be any kind of information system (TPS, MIS, DSS, etc.) that use IT to help an organization gain a competitive advantage, reduce a competitive disadvantage, or meet other strategic enterprise objectives. Most organizations do not have a well-defined decision making system. So even with the right MIS tools, very little can be achieved in terms of improving decision-making. Based on these limitations—plus other underlying issues that arise from the main discussion an integrated model is proposed through this study. A well-defined decision making system should be fledged in businesses so as to provide a viable working environment for MIS. A good place to start here would be the inception of a centralized place where all decisions in businesses are channeled through. Development is a very deliberate and orderly approach to making a system a reality. A methodology is needed to provide structure to system development. There is traditional system development life cycle for information systems, including a DSS. Each computer aided software engineering has adopted a variation. Further complicating matter ;each organization that develops system can create in house variation to suit specific application. Each methodology emphasizes different steps in different ways. But all the SDLCs that make intuitive and practical sense generally most follow certain guidelines and process.

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Ideally some kinds of need start the process and a completed system is its result. A traditional SDLC consists of four fundamental phases-Planning, Analysis, Design and Implementation.

The rest of the paper is organised as follows: in section two, past literatures have been reviewed to find out the gap of relevant studies conducted earlier. Section three discusses the sources of data and the way to analyze those. Section four discusses the role of Information system in Business firms. Then section five presents a strategic model for designing the proposed system after studying some conventional systems and their lacking to fulfill organizational demands. Water fall model is followed here in designing phase. The decision making process of the executives is evaluated through internal and external scanning of business environment. The whole conceptual idea is presented through a sophisticated Entity Relationship Diagram which represents the system as a whole in subsection of section five. Finally after the theoretical discussion of various business operation and the need of an integrated system, the proposed one in developed practically by using programming language and tested to serve the purposes of the firm and it was found in the satisfactory level.

1.1 Objectives of the Study

1. To know about the roles of Information System in Business firms.
2. To identify the practices of Information system by the firms of Bangladesh.
3. To find out the gap between the current practice and the potentiality of an integrated system for the firms.
4. To design a model that can integrate the operations of a typical business firm.

2. Literature Review

In 2003 Linda Argote et al discussed in their studies the mechanisms of knowledge management and how those mechanisms affect a unit's ability to create, retain and transfer knowledge. Emerging themes in the literature on knowledge management are identified. Directions for future research are suggested in their study. Srinivas Nowduri in 2005 described and analyzed the role of Management Information Systems in light of its capability for decision making. Decision making process and its impact on top level management in a business organization is explained with an emphasis on automated decision making. Musumba B. F. Mugoya identified In his paper in 2008 that increasing demand for accuracy, efficiency and effectiveness coupled with discerning consumers of services had meant that all types of organizations are striving for greater productivity, while maintaining or enhancing quality within their services. This applied to both private and public organizations. An Automated Integrated Management Information System is a way of bring many methods of reporting into one working environment. The combination of IS investment with these IS management factors on results in additional increase of firm output and labor productivity beyond the individual effect of IS investment. Hana Kopáková and arkéta Škrobá ková showed in 2010 that programmed decisions are repetitive or routine and can be solved through clear-cut mechanical procedures, such as applying the rules to find the best solution. Up to 90 percent of management decisions are programmed. Although each group of
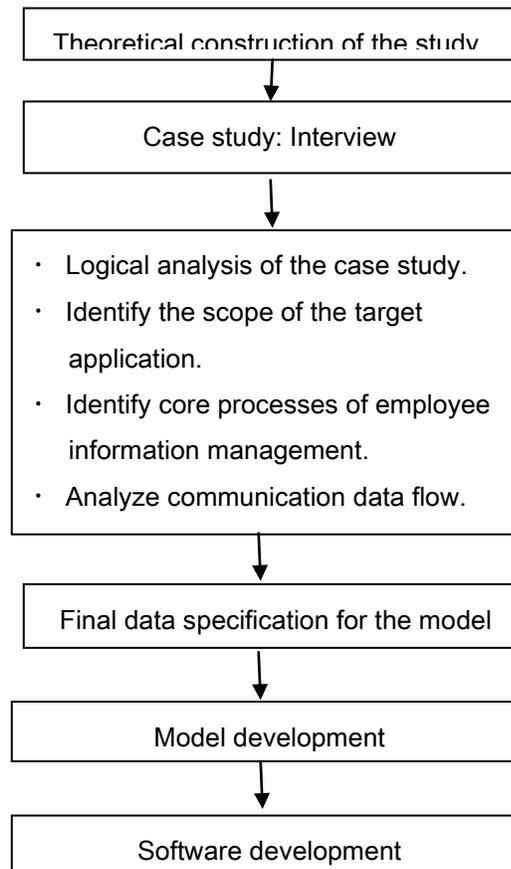
decisions is specific in domain and time demandingness, we can find common principles and tools for making better decisions. Al-Zhrani, opined in 2010 that the process of decision-making in any business is an inherently vital aspect not just for organizations but also for individuals who greatly rely on these decisions for their survival in the highly competitive arena of entrepreneurship. Vittal & Shivraj told in 2008 that Management Information systems play the crucial role of providing a wide range of streamlined options from which decision-makers are able to make their preferred choices. Jahangir in 2005 states that based on the significant role that information plays in choice of decision to be made, organizations must ensure that they have a good management information system. As a notable general observation, a good MIS ensures good decision making just in the same way bad MIS propel the making of bad decisions. UStudy.in supports the above observation in 2010 by saying that "The quality of managerial decision-making depends directly on the quality of available information" and the managers should therefore cultivate an environment that encourages the growth and viable sprouting of quality information. Fisher and Kenny suggested in 2000 that organizations infuse information systems into their operations so as to enhance competitiveness and facilitate business growth and success. Laudon and Laudon (2001) believed that information systems are embedded in organizations and are the result of standard operating procedures, work flows, politics, organizational culture and structure. Chaffey and Wood opined in 2005 that although organizations have different information systems because they have varying information needs, they all strive for competitive advantage through continuous improvement; re-evaluation of the effectiveness and efficiency of their business information system.

3. Methodology of the Study
In order to develop a model, employee management systems of several industries are studied.

Figure 1: Research steps

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│  Theoretical construction of the study   │
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│           Case study: Interview          │
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│  · Logical analysis of the case study.   │
│  · Identify the scope of the target      │
│    application.                          │
│  · Identify core processes of employee   │
│    information management.               │
│  · Analyze communication data flow.      │
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│     Final data specification for the model│
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│             Model development            │
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│           Software development           │
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The data specification for creating a data base is done through a case study in those industries. Operation flows and information flows in the employee management were my focus during data collection. The information required to integrate the system is identified. Steps of conducting this research are given in Figure 1.

The data specification for developing the model and program is done through case studies from several service and manufacturing organizations of Chittagong city. Data were collected from three categories of stakeholders:

1. Top level Managers and directors.
2. Mid level Managers.
3. Operating level Managers.

4. The Roles of Information System in Business

An information system (IS) is any combination of information technology and people's activities using that technology to support operations, management, and decision-making.[1] In a very broad sense, the term information system is frequently used to refer to the interaction between people, algorithmic processes, data and technology. In this sense, the term is used to refer not only to the information and communication
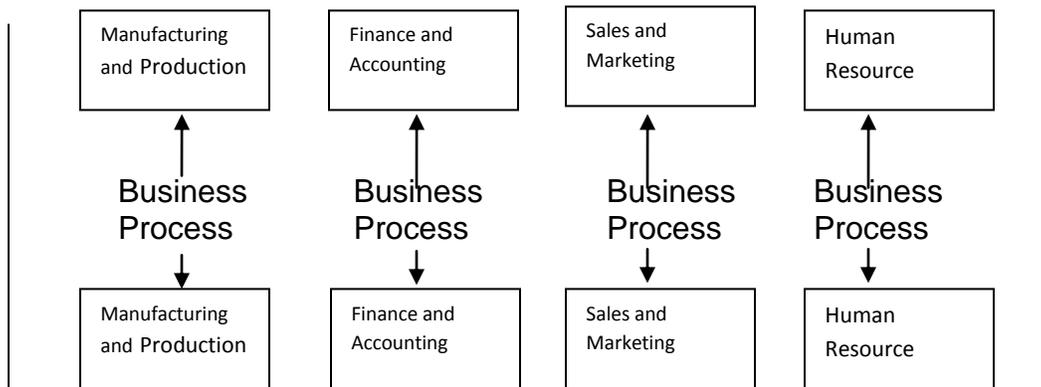
technology (ICT) an organization uses, but also to the way in which people interact with this technology in support of business processes.

Information technologies are a vital component of successful businesses and organizations. Information technologies, including Internet-based IS, are playing a vital and expanding role in business. IT can help all kinds of businesses improve the efficiency and effectiveness of their business processes, managerial decision making, and workgroup collaboration, thus strengthening their competitive positions in a rapidly changing marketplace. This is true whether IT is use to support product development teams, customer support processes, electronic commerce transactions, or any other business activity. Internet based information technologies and systems have become necessary ingredients for business success in today's dynamic global environment.
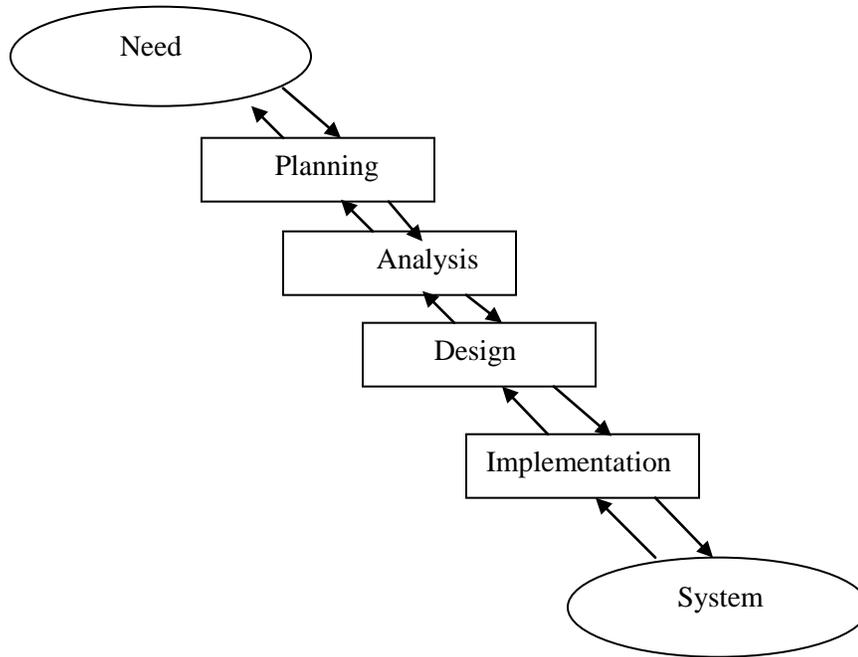
An organization's IS plays an important role in helping it adopts and maintain a strategic position. Information technologies support efficient business operations, workgroup and enterprise collaboration, or effective business decision making. IT can change the way business compete.

Figure 2: Traditional view of systems

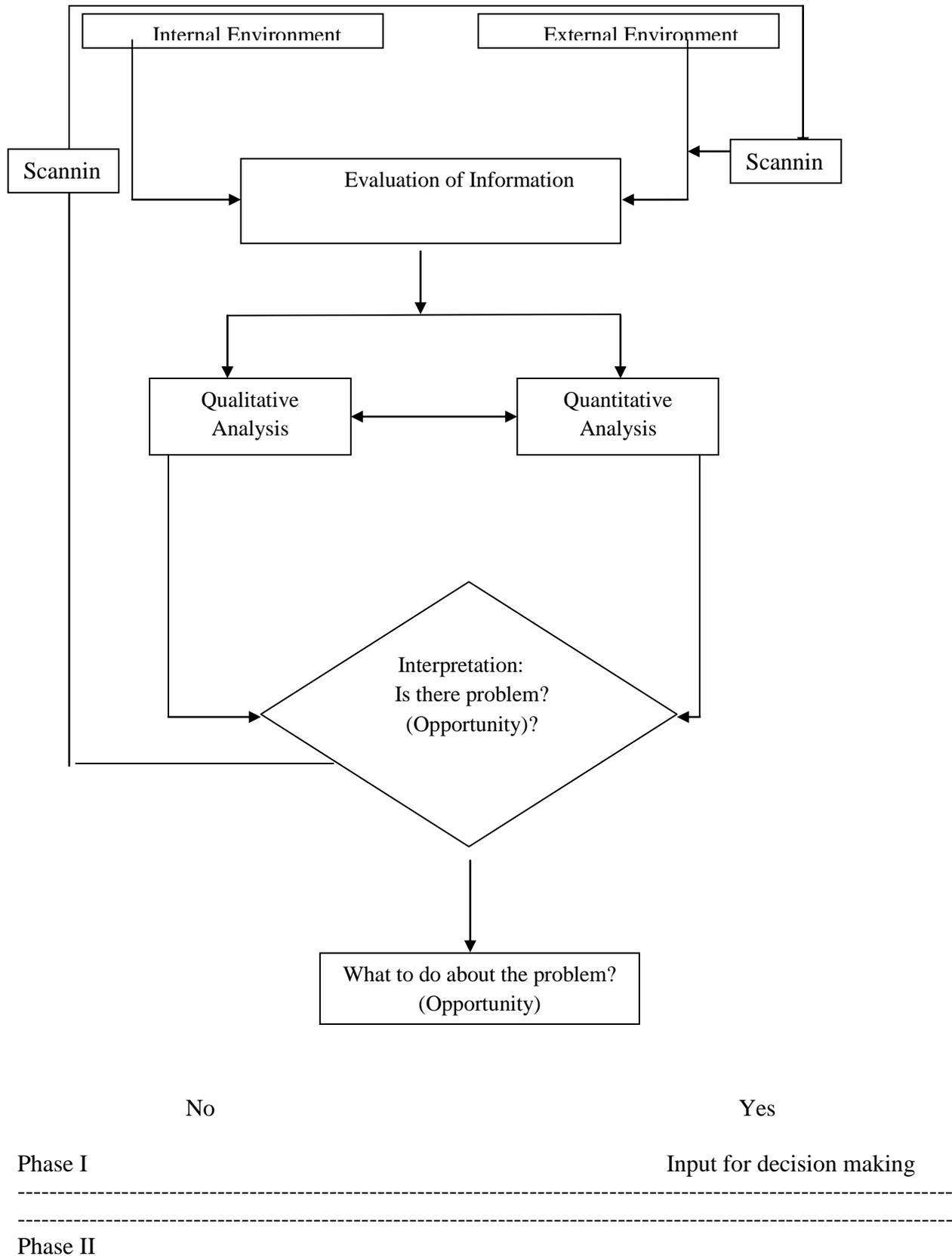| Manufacturing and Production	Finance and Accounting	Sales and Marketing	Human Resource
Business Process	Business Process	Business Process	Business Process
Manufacturing and Production	Finance and Accounting	Sales and Marketing	Human Resource

5. The System Architecture

Figure 3: A quick overview of the system

Ideally the project "flows" down and to the right .The upward arrows indicate that changes while developing a system can return the process to an earlier stage. This is also known as waterfall development.

Figure 4: The decision making Process of Executives.

| Internal Environment | External Environment |

Scannin

Evaluation of Information

Scannin

Qualitative Analysis ←→ Quantitative Analysis

Interpretation:
Is there problem?
(Opportunity)?

What to do about the problem?
(Opportunity)

No   Yes

Phase I   Input for decision making

Phase II

5.1 Planning

The planning phase starts with a business not being met. This includes possible opportunities identified through environmental scanning. Question concerning technical feasibility, cost feasibility and organization feasibility are answered here.
Systems today are of course built with efficiency in mind, but they have become vitally important for staying in business. Decision Support Systems are as vital as are capital improvement such as modern buildings or corporate headquarters. Improvements as decision making (speed, accuracy, and comprehensiveness), serving ever higher customer and client expectation, coordinating dispersed group in organization have become important reasons for building Decision Support System.

5.2 Analysis

In this phase the question related to the users, the functionality etc is answered. The users of the proposed system are the decision makers of various levels of an organization. The executive decisional role is a major one. As shown in the figure information flows from the internal to external environments. Internal Information is gathered from the functional unit (Finance, Marketing, Production, Accounting and so on).External information come from sources such as Internet and other online database, Newspaper, Internet news services, Industry publication, Government reports etc.However because of the large volume of information available. Environmental scanning is needed to find out the relevant items. Many business large and small use computers to help in the control of daily activities. Some company uses are as follows:

Maintaining Employee Records
Computer based system helps to store, retrieve and update information concerning employees.

Payroll Processing
Preparing and updating salary statement of different categories of employees by using computer makes the job very easy.

Accounts Receivable
An accounts receivable system keep records of money owed by customers to another entity in exchange for goods or services that have been delivered but not yet paid for.

Accounts Payable
An accounts payable system keeps records of people to which the company owes money. This system enables the company to schedule its payment in way, which is in the best interest of the company.

Stock Control
Computer based stock control system enables a user manage his stock more effectively. Inventory manager can give information regarding to stock availability just in time. A solver is an algorithm or procedure written as a computer program for performing certain computation for a particular problem. The question how much to

order is answered by Economic Order Quantity. It is the order size that minimizes the sum of the cost of the ordering inventory and the cost of carrying inventory. The EOQ can be found by means of a formula that can be derived using $E=\sqrt{2QP/c}$

General Ledger
The general Ledger of a company consists of a list of accounts under which the company earns review and pays expenses.
To do business in new ways we have to use computer to get product to market much quickly and dramatically cut manufacturing costs.

Designing New Products
To complete in the global market, firms need to design new products quickly. A basic index of business performance is time-to-market. The time it takes to develop new product and get them to customers. If you time to market is too lengthy, you will be out of business because your competitors will have make it market before you.

Streamlining Manufacturing
Companies have been using computers to cut manufacturing costs and time for more than two decades. Computer Aided Design (CAD), Computer Aided Manufacturing (CAM) tools are being used by which it makes possible to create three dimensional image that can be rotated. Virtual manufacturing also called Computer Aided Production Engineering (CAPE) represent a new way of approaching the manufacturing process.

Automatic Process
In Computer Integrated Manufacturing (CIM), Computer links the entire procedure from order entry to production and from warehousing and distribution. On the factory floor CIM software controls conveyors, robots and automatic guided vesicle (AGV).CIM compresses p[production times into analyzing brief spans. Production cycle can be finished within day or hours once it required week or months.

By applying the Linear Programming Model the decision about profit maximization and cost minimization can be taken. The decision theory may be applied to attach problem in a systematic way when not all alternatives are clear and unambiguous. Transportation problem deals with a variety of shipping routes and different costs for the routes, the objective is to determine how many unions should be shipped from origin to destination demands are satisfied and total transportation cost is minimized. The objectives of queuing theory are to achieve a good economic balance of waiting time cost and service cost. Any business situation involves competetion.Competetion is well known in the modern life. Competitive situation exists when two or more opposing parties are making decisions involving conflicting interest. The game theory contributes to compete against the competitors in the market effectively. By applying the project management theory a business organization may complete any project in an efficient and effective manner.

5.3 Design

The design phase indicates how the system will work, considering all the details of the hardware, Software, Network Infrastructure and so on. The entity Relationship diagram is the major part of this phase, which is shown below:

Figure 5: The entity relationship of the system
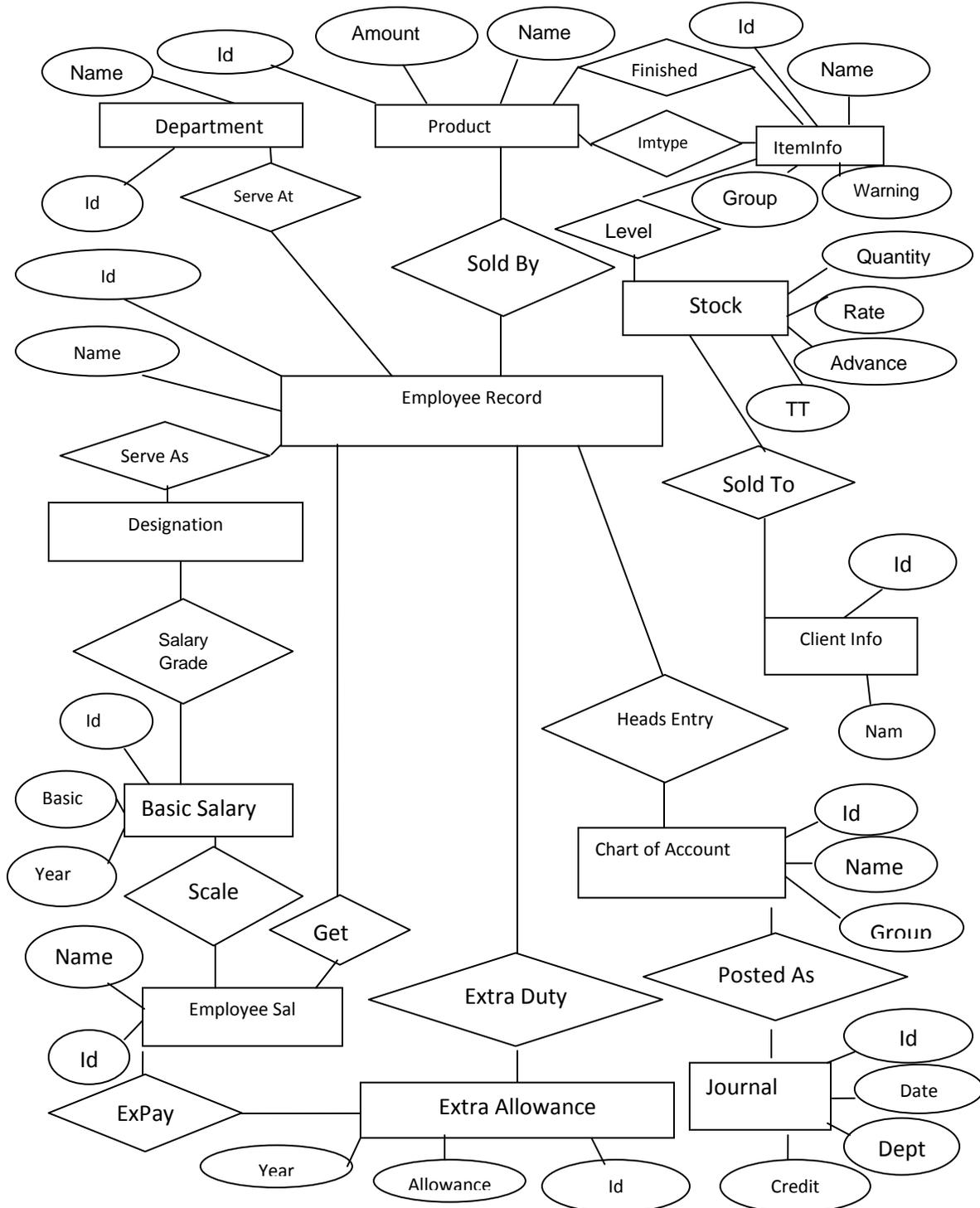
5.4 Implementation

This stage starts with the testing of the system in any platform and installing that after successful testing. This is accomplished in the proposed system after design phase implanting the Table below and also writing the codes in Oracle 9i as backend and Visual Basic in frontend:

Employee Record:
           1. Id:
           2. Name:

Department:
           1. Id:
           2. Name:

Designation:
           1. Id:
           2. Name:
           3. Priority:

Product:
           1. Id:
           2. Amount:
           3. Profit:
           4. Group:

Stock:
           1. Quantity:
           2. Advance:
           3. Rate:
           4. Transaction Type (TT):

Chart of Account:
           1. Id:
           2. Name:
           3. Group:
           4. Credit:

Basic Salary:
           1. Id:
           2. Year:
           3. Basic:

Employee Salary:
           1. Id:
           2. Name:

Extra Allowance:

      1. Id:
      2. Allowance:
      3. Year:

Item Info:

      1. Id:
      2. Name:
      3. Warning:

Client Info:

      1. Id:
      2. Name:

Journal:

      1. Id:
      2. Date:
      3. Debit:

The system is capable of accommodating all most all possible business operations of a typical organization and thus reduces the time, cost and complexities. As a result organizations will be benefited by providing prompt service with low cost, Designing products and services according to consumers demand, Effective inventory management, Maintaining the accounts and finance, Saving time in recruiting employees, Selecting the best candidates, Measuring the performance of the employees accurately, Ensuring competitive compensation through economic analysis, and accordingly increasing the customers loyalty to the firms.

6. Conclusion

After the study it is almost clear to us that how Information system can influence the business. This is the era of globalization; by standing on this time without Information System development of any business is quite impossible. To cope with the modern technology and to be fluent in business operation an organization can't think without information system. In business information is a most important tool is information to get rapid information and for availability of authentic information an organization must have to develop its Information system. The development of a new system must be carefully managed and orchestrated. Each project involves research and development. Requirements are hard to define at the level of detail for automation. Multiple users have different sets of requirements and needs. So cost, Benefit and project schedule must be assessed while developing the system. Here I tried to consider all of the things in this regard. The system proposed here would be an effective tool for managing any internetworked business enterprise. Principally, it is inherent to note that in spite of the fact that this paper is expressively analytical, more research needs to be done in order to bring more information into public knowhow. Moreover, business owners must learn to cope up with the ever changing trends in MIS and decision making, without which it will be very challenging to make positive progress in decision making. Finally, it is vital to remember that improvement in decision making is fundamentally meant to ensure

customer satisfaction while businesses continue to flourish in success. All MIS strategies should therefore be tailored in a way that the above business goals are achieved.

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