Chapter 1
What Are Enterprise Information Systems?

What makes 'people' the central and most important nerves of Enterprises? Enterprises are created by 'people', run by 'people' and most definitely exist to serve the desires of 'people' within the environments.

1.1 Chapter Introduction

The book begins by introducing Enterprise Information Systems, briefly describing previous attempts to integrate enterprise Information systems in support of organization goals. Chapter 1 summaries enterprise information system components and describes various management styles before ending with several different visions of enterprise information system noticed over the years.

Throughout this book the word "Enterprise" is used to imply some degree of effort, by one or more persons, for the purpose of searching new discovery, some form of economic gain or another form of obtaining greater good. Enterprises can be extremely large and well-functioning business organizations, or as small as few high school students putting ideas together to open a hip-hop music store on the Internet to earn pocket money. Both of these examples have one thing in common: undertakings by individuals for a greater good.

1.2 History of Enterprise Information Systems

To understand the origins of enterprise information systems, one must first look at the basic stages of information technology strongly characterized by input, processing, output and communications of solutions for personal and organizational problems throughout the human history (Augarten, 1984; Butler, 1997; Laudon et al., 1996; Marakas & O'Brien, 2011; Moreau, 1984):

- **The Pre-mechanical Age (3000 B.C.–1450 A.D.):** This pre-mechanical age was recognized for a number of developments that plays a vital role to the development of what eventually contributed to enterprise information systems. First was the creation of writing and alphabets as a primary means of communications. Then came the invention of paper and pens as the first input technologies. They were followed by books and libraries as permanent storage devices. Subsequent developments in this age included the First Numbering Systems and the First Calculators.
- **The Mechanical Age (1450–1840):** The Mechanical Age saw a mini Information Explosion with the invention of movable metal-type printing process. This enabled the development of book indexes and use of page numbering. The first general purpose computers came into light during this period.
- **The Electromechanical Age (1840–1940):** This age let us harness electricity by converting knowledge and information into electrical impulses. Thus, the beginning of telecommunications involving voltaic battery, telegraph, telephone and radio was the first attempts at electromechanical computing came about during this period.

- **The Electronic Age (1940–1960):** The first high-speed, general purpose computer using vacuum tubes were invented in the 1940's followed by the first stored program computer and immediately followed by the first general purpose computer for commercial use in late 1940s. Enterprise information system dates back to WWII when battle field activities required the tabulation of data for decision making. This 1940's version of enterprise information systems served as useful tools that provided the military generals with competitive advantage in their business of winning wars.
- **Data Processing Systems (1960–1970):** Large sets of data started to be collected by organizations and innovative companies began to use technology to improve their management reporting systems and reduce cost of production.
- **Mainframe Computers (1970–1980):** Computers at this stage were massive in size and storage capacity. This enabled companies to centralize various systems and link computers to a number of business functions (mainly inventory, customer billing and employees' payroll). The emphasis of this decade was to automate existing business processes.
- **PCs and LANs (1980–1990):** Many smaller computers (PC) started to appear on the market at relatively cheap price. This allowed medium size businesses to buy several small computers and link them together (LAN). This allowed each PC in the business to be linked to the business software (mainly Word Processors and Spreadsheets) run by the IT department. This technology initiated Decision Support Systems and Strategic End User Support.
- **Wide Area Networks (1990–2000):** Businesses began to extend the network technology to include wider geographical space called Wide Area Networks (WANs). This allowed for increased central control and encouraged corporate learning resulting from system and data integrations.
- **eBusiness Global Enterprise Systems (2000–2010):** The proliferation of Internet in this decade facilitated the expansion of WAN to include global enterprises and partnerships between businesses in the form of supply chain and distribution systems. By sharing data across various groups of enterprises business improved efficiencies and speed in inventory, manufacturing, distribution.
- **Social Networks (2010–Present):** Companies have started to take advantage of Internet communities to market products and services as well as artificial intelligences. Businesses are to encourage members of these communities of potential buyers to determine demands and feedback for products and services.

1.3 What Is an Enterprise?

The hullabaloo surrounding entrepreneur and entrepreneurship during the last decade has led to several debates and confusions over the term enterprise. Many practitioner magazines, websites and probably school courses would leave you thinking enterprise is just about setting up a new business. The first business course you took in secondary school (high school) might have suggested the word "enterprise" to have two common meanings summarized below:

1. That enterprise is simply another name for doing business. Practitioners have also incorporated this meaning of the word enterprise when writing non-academic books. They generally use enterprise to mean start-up businesses: *"Oprah Winfrey's enterprise is called OWN."*
2. Others use the word enterprise to describe the actions of someone who demonstrates certain degree of risk or personal, either by setting up a business or agreeing to invest in or even agreeing to run a business. This meaning is demonstrated when one reads: *"Oprah Winfrey became an entrepreneur upon launching OWN on January 1, 2012."*

Both definitions above actually diminish our use of the word enterprise. While enterprise could simply be defined as *'the ability to turn an idea into a successful business,'* a successful enterprise is about having the skills and competencies to succeed in a highly competitive and often challenging business environment (Eskew, 2007; Gartner & Bellamy, 2008). Thus, this definition of enterprise focuses on the entrepreneur possessing and/or developing skills, attitudes and knowledge in several areas, amongst which are:

1. **Enterprise capability:** This involves the ability to manage risk appropriately, deciding and incorporating innovation, having the drive to make things happen, as well as dealing with creativity.
2. **Economics of Business:** Here is where an entrepreneur must demonstrate the ability to understand the full context of business.
3. **Financial literacy:** The entrepreneur must not only demonstrate the ability to manage finances but also become capable of questioning and informing various stakeholders about financial situations.

An 'entrepreneur' is therefore a person who takes initiative and that person usually *"makes things happen."* That person tends to be very decisive at critical moments of difficulties for the business. When business opportunities are identified that person must quickly recognize the appropriate moment and be prepared to take proactive actions (Habib, Hege, & Mella-Barral, 2013). Being bold enough to take decisions in questionable situations demonstrates that an entrepreneur has the capability to take initiatives that would make the enterprise very successful.

All business decisions (i.e., to invest in something new, or employ a new staff, or open a new branch or give loan to a customer) carry an element of risk. And finance theories teach us that a chance or probability exists that something may go wrong for every enterprise. Since no enterprise is totally guaranteed entrepreneurs are always aware of the risk that any investment could lead to losses and the entrepreneur may become personally liable for the debts of that business (Habib, Hege, & Mella-Barral, 2013). Therefore all entrepreneurs must ensure they are only taking calculated risks. Entrepreneurs take this precautionary measure to ensure that the likely returns from taking a particular risk are sufficient to make the chance worthwhile.

Because most enterprises are of a commercial, financial, or business nature, the objectives, roles or purpose of enterprise would be dependent on the products, or services that the business would be offering. For example, a bank operates differently than a university or a healthcare provider. Even in the broad areas of similarity, such as a supermarket like Wal-Mart or Tesco, and department stores like Macy's or Zara Store, which are all retail enterprises, the ways, models, growth areas and the productivity of each of these enterprises are different.

1.4 What Is an Information System?

To fully grasp the meaning of IS one must first appreciate the Systems Concept. A system can be defined as group of interrelated components, which must have clearly defined boundary working toward the attainment of a common goal showing the acceptance of inputs and clearly producing outputs in an organized transformation process (Dunn, 2005; Marakas, 2007; Piccoli, 2012). Information Systems in organizations refers to the arrangement of all components and resources necessary to deliver information and functions to that organization. Such resources would normally include, but not limited to, hardware, software, and people to perform input, processing, output, storage, and control activities that transform data resources into information products (Marakas, 2007; Piccoli, 2012).

The IS department must ensure information belonging to the organization goes through a number of stages explained below:

- All data should be collected and converted to forms that are suitable for processing (input) by the IT.
- All data can be manipulated and converted into information (processing),
- All data can be stored for future use (storage),
- All data can be communicated to their ultimate user (output)
- All data are put through the correct processing procedures (control).

1.4.1 Roles of Information Systems in Business

Businesses anticipate three vital functions to be performed as a result of investment in IS. IS produces business applications that support an organization's business processes and operations, business decision making, and strategic competitive advantage. These applications are usually combined into cross-functional information systems that provide information and support for decision making as well as performing operational information processing activities. Amongst such applications are: strategic information systems, process control systems, expert systems, enterprise collaboration systems, management information systems, executive information systems, transaction processing systems, knowledge management systems, decision support systems, and functional business systems. Information systems perform three vital roles in any type of organization (Marakas & O'Brien, 2011).

- **Support of business processes and operations:** Examples of supported business processes include activities such as sales transactions, inventory ordering, and payroll processing.
- **Support of business decision making:** Systems can support less structured business activities such as deciding which product lines to add or discontinue. While these types of decisions require human creativity, information systems can support managers in this process by providing them with useful information on demand.
- **Support of strategies for competitive advantage:** Information systems can make available new types of products and services through which an organization might gain a competitive advantage.

1.5 The Components of Enterprise Information Systems

Enterprise information system are comprehensive, large scale application-software packages, which use the powers of IT for supporting processes, reporting, data analysis and information flows (Pereira & da Silva, 2012). These IT powers include data storage, computational, and data transmission and are done between and within complex organizations. IT packages used in an enterprise environment are often referred to as packaged enterprise application software (PEAS) systems. Enterprise information system can be considered a broad term that includes "enterprise," "packaged," and "application" and used interchangeably for Enterprise Resource Planning (ERP), Supply Chain Management (SCM) and Customer Relationship Management (CRM). This form of enterprise information system can typically be a relational database usually built on software platforms like Oracle, SAP, and NetWeaver.

All organization-based IS must have five different components:

- Hardware component includes machines and the media used for information processing;
- Software component includes computerized instructions (commonly refer to as programs) and instructions for people (commonly refer to as procedures).
- People component includes information systems professionals and end users.
- Data component includes alphanumeric, text, image, video, audio, and other forms of data.
- Network component includes media used for communications and network support.

There are several different types of IS in organizations today. They can generally be classified into eight separate areas, based on the major roles each plays in the day-to-day running of the organization:

- **Management Support Systems:** These are frequent Information systems that provide information and support for effective decision making by managers. These types of systems include executive information systems, decision support systems, and management information systems.
- **Enterprise Collaboration Systems:** Enterprise collaboration systems facilitate team or workgroup communications and productivity. These include e-mail, instant messaging, message boards, digital whiteboards, wikis, and videoconferencing.
- **Process Control Systems:** These systems monitor and control physical processes such as production lines, package routing, and heating and cooling systems.

- **Decision Support Systems:** These systems help enable the day to day operations of an organization. They include office automation systems, transaction processing systems, and process control systems.
- **Functional Business Systems:** These are systems that focus on basic business functions such as accounting, marketing, sales, finance, and human resource management.
- **Cross-functional Information Systems:** These are information systems that cross the boundaries of functional business areas and management levels in order to support business processes throughout the organization.
- **Transaction Processing Systems:** Transaction Processing Systems (or TPS) are a type of operations support system. A TPS processes routine business transactions such as sales or purchases.

1.6 Management and Vision of Enterprise Information System

Project management has been defined as the planning, organizing, directing, and controlling of total resources for the purpose of accomplishing a set of objectives (Guah, 2009). The management of enterprise information systems integrates transformation efforts and provides management with information about the organization resources. Others have defined enterprise information system management as the need to ensure successful change (Dunn, 2005; Motiwalla & Thompson, 2011; Piccoli, 2012). Svejvig (2013) suggests the need for planning before enterprise information system implementation but does not provide specific project management details that would lead to the anticipated transformation.

Planning enterprise information system implementation involves defining the anticipated transformation goals and objectives, stakeholders, and risks; integrating tasks, responsibilities, and timelines; as well as establishing the management, implementation, and informational infrastructures and process required (Kaufman, 1992; Sink & Morris, 1995). Such management involves the empowering of people responsible to introduce and lead the organization through the change process by systematic organizing and directing enterprise information system activities. They would be responsible for controlling the transformation—involving the use of standards, measures, and feedback mechanisms; as well as the conduction of regular review meetings and publishing status updates. During an enterprise information system implementation process, the management team should maintain a structure that enables the organization to easily remove barriers and maximize new opportunities for improvement.

Enterprise information system implementation is a complex and timely activity to undertake. The first step in achieving successful enterprise information system implementation is to create a vision of the future (Barthélemy, 2006; Eskew, 2007). Ruff (2006) offers the integration of corporate foresight with innovation as a strategy for introducing meaningful transformation in business (Habib, Hege & Mella-Barral, 2013). Strategic planning has been offered as a method to drive organizational change in successful organizations.

1.7 Setting Enterprise Information System Goals and Objectives

Good management practice dictates that setting goals and objectives is the best way to convert company's aspirations and visions into successful achievements. Without a systematic plan, the operations process often gets convoluted and too many things go wrong. Any meaningful progress in organizations fully depends on the initial drafting of a plan. The process of setting goals and objectives is relatively straightforward and will help you in all areas of your life, especially in business. The following steps will help you set goals and objectives. Organizations use a number of project management software as a helpful tool in setting goals and meeting objectives:

- Clearly define the business goals which may simply be your desired outcomes. They may include the desire to expand the organization or increase the number of staff or profits next year. These goals are your business visions for the future. An important function of business managers is to ensure these goals are accurately written down. They often include various organization stakeholders, including management team, accountant and partners, in the brainstorming process to ensure the goals are realistic.

- It is also important to clearly define the organization objectives. Every organization has its business objectives which are generally smaller goals and the means by which that organization's ultimate goals are met. For an organization where top management have decided the ultimate goal for the year is to increase sales revenue in the upcoming month by $5m, the objectives are the steps that must be taken in order for the goal to be realized.
- To find acceptable and realistic objectives, take time to think about and write down all activities your organization may need to accomplish to reach its overall goal. Cross-off all those objectives that seem unrealistic. The final list of information should help significantly to break down the organizational goals and objectives and insert them into a project plan.
- Create a project plan. After defining the organizational goals and objectives, the thing is to come up with a plan to put them into action. To begin, list down the goal on the top of the list. List each objective under the goal, creating a basic outline of your overall plan. That would be considered the first step for the project plan.
- Care must be taken in the process of assigning projects to responsible individual staff member or team to meet each objective. Using the basic outline, assign each objective a start date and a deadline. Create a Gantt Chart using a whiteboard or calendar, indicating the date on which each should be completed. Most organizations would use electronic project management software (including Microsoft Project) as very easy to use and wonderful tools to clarify and meet objectives associated with reaching overall goals.
- Schedule status meetings. While the project is in process, team members must meet regularly to discuss the progress of each objective. Always refer to the Gantt Charts and update the status of each category as needed. This is crucial for deciding whether deadlines may need to be changed and objectives may need to be added as the team gets closer to the organization goal. It is best to schedule meetings in the morning to allow staff sufficient time in the day for completing each task.
- It is terribly important to be realistic when setting organizational goals. Those goals that cannot be attained under normal working conditions sometimes make objectives extremely difficult, if not impossible, to meet. It is advisable to maintain an ongoing journal of all the organization goals, that must be referred to often and think of ways to realize them. Due to the importance of this process, top management must involve the fiscal (accounting) department or an CPA to determine costs associated with meeting objectives.
- Never forget to leave sufficient time to complete each objective in order to reach the organization goals. By pushing through with objectives that are not carefully met usually leads to negative effect on the long-term goals. Thus, it's necessary to be proactive.

1.8 Chapter Summary

Most IT books would emphasize that IS focus on business stakeholders. While focusing on the goals of stakeholders is necessary to create successful enterprise information system, an exclusive focus on business stakeholders could lead to problems. There might be other issues like systems that does not meet end-user needs, or one that is not technically feasible. A successful enterprise information system must not only meet the business needs of the organization, but also be supported by disparate members of the management team. If an enterprise information system does not pay attention to the strategic needs of the organization and the particular goals of individual stakeholders, it will most likely be rejected by management, regardless of how well it might meet the needs of end users.

In different parts of this book, you shall read how understanding enterprise goals and requirements are vital for enterprise information system that incorporates stakeholder analysis as part of its core process. The book demonstrates how firms need to strike a balance between the actual performance levels and the ideal performance standards of an EIS project. The core issue in EIS project management is the time factor. Guah (2007) suggests the firm should ensure that the EIS project does not lag too much behind. To ensure this, the firm must first specify targets that can be reviewed and analysis regularly carry out.

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