The Applications of Expert System Among the Top Corporations in Metro Manila and its Perceived Advantages and Disadvantages

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Review of Integrative Business & Economics Research

ABSTRACT

Majority of companies in Metro Manila are now using Expert System (ES) or Artificial Intelligence (AI), it offers expert knowledge in decision making in various areas. It is a man-machine system with specialized problem solving expertise and applying business "if-then-else" rules to a variety of specific business problems of a company. The research design used was descriptive. The data gathered from the respondent companies thru survey was used for analysis. Based on the finding results, only 12 companies or 13.95 % (out of 86 companies) claimed that they are using ES. It supports them to analyze important data in able to come up with a good decision making. These companies also mentioned that ES makes their information easily seen (3.49%), promotes good security and only makes information accessible only to their employees (6.98%). Moreover, companies also mentioned that ES enables them to capture all important data for decision making (4.65%). Lastly, the respondents stated that ES have the computer ability to make suggestions and act like an expert in a particular field (6.98%). The proponent also found out that there's more perceived advantages compared to disadvantages of using ES by the top corporations in Metro Manila.

Keywords: Expert System, Artificial Intelligence, Information System,

1. INTRODUCTION

1.1 Background of the Study

In today's dynamic business environment, many consider information as a power. However, the power of information can be maximized if used efficiently and effectively. Information itself can be considered as valuable, and commerce often involves the exchange of information rather than tangible goods. Organizations use information to assist them in their daily business operations such as keeping records, inventories and sales. The process of collecting and analyzing such components are often referred to as information systems. An information system (IS) is a set of interrelated components that collect, manipulate, store, and disseminate data and information and provide a feedback mechanism to meet an objective. (Reynolds & Stair, 2012)

Hossein Bidgoli (2012), states that information is the second most important resource next to the human element. He discusses that information systems can aid an organization in various ways depending on the use. When information is timely, relevant, and accurate, businesses can use this as a critical tool in enhancing a company's operations and competitive standing. Moreover, the proper use of information can aid an organization manage its resources and capabilities. Information systems can help organization strategize and gain a competitive advantage.

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Expert systems have been one of the most successful Artificial Intellegent (AI) - related technologies and have been around since the 1960s. They mimic human expertise in a field to solve a problem in a well-defined area. ES consists of programs that mimic human thought behavior in a specific area the human experts have solved successfully. (Bidgoli, 2012)

ES gives the computer ability to make suggestions and act like an expert in a particular field. It can help the beginner user to perform at the level of an expert. The unique value of ES is that they allow organizations to capture and use the wisdom of experts and specialist. ES can be applied to almost any field or discipline. They have been used to monitor nuclear reactors, perform credit evaluations, and develop marketing plans for a new product or new investment strategy. The collection of data, rules, procedures, and relationships that must be followed to achieve value or the proper outcome is contained in expert system's knowledge base. (Reynolds & Stair, 2010)

Futhermore, Reynolds & Stair added that ES consists of a collection of integrated and related components, including a knowledge base, and inference engine, an explanation facility, a knowledge base acquisition facility, and a user interface. These components must work together to provide expertise. Also the inference engine coordinating the flow of knowledge to other components of the expert system, however there can be different knowledge flows, depending on what the expert system is doing and the specific expert system involved.

1.2 Rationale of the Study

The proponent's interest on the topic of Information System specifically Expert System (ES) began when the proponent started teaching Computer Application for Business Management Students, Management Information System for Business and Entrepreneurship Students, System Analysis and Design, and IS Planning for undergraduate of the Decision Sciences and Innovation Department – De La Salle University Manila. In addition, the undergraduate degree of proponent was Computer Science specialized in Software Technology. The proponent has the interest to know how ES or AI was being used in different companies in Metro Manila, Philippines, and what are their perceived advantages and disadvantages of using ES / AI. It is worth knowing because uses of ES / AI helped the company achieve their goal and objectives, and it also improve their business processes, this will enable them to speed up their business transaction, save more time and effort, increase sales, lower down the costs and expenses.

1.3 Statement of the Problem

What are the applications of using Expert Systems (ES) by the selected top corporations in Metro Manila, Philippines? And what are the perceived advantages and disadvantages of ES?

1.4 Objectives of the Study

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The general objective of the study is to enumerate the application of Expert System (ES), and to describe the perceived advantages and disadvantages of using ES among the top corporations in Metro Manila, Philippines based on the definition of IS by Reynolds and Stair which Expert System is an organized collection of people, procedures, software, databases, and device used to support problem specific decision making in terms of man-machine systems which specialized problem-solving expertise.

1.5 Significance of the Study

The result of the study will benefits the following :

- Academic Community

This research paper will benefit faculty teaching computer subjects, and the students taking up MIS courses and subjects. The faculty can share the information of this research papers to their students, and they would also have idea on what specific topics need to be discuss in class lecture. On the other hand, students would be able to apply it in the real business application when they graduate.

- Different corporations in Metro Manila, Philippines

To give them feedback on how other companies use the Expert System (ES) for their daily business transactions. They can also benchmark the best practices from companies that are using Expert System. The companies can also have idea on how to further improve in the utilization of their Expert System which can help them streamlined their processes and enhanced their decision making processes when working in group.

1.6 Scope and Limitation

The uses of Expert System (ES) focused on this study will be limited to 100 top corporations in Metro Manila, Philippines. The data gathering was assisted by proponent' students in Management Information System (BUSIMIS) class during 1st term AY 2009-2010, and it was limited to 100 top corporations based on their gross revenue in Metro Manila, Philippines which was stated in Business World Magazines (Volume 22) published early 2009. Business World Top 1000 Corporations in the Philippines is published annually by Business World Publishing Corporation, with editorial offices at 95 Balete Drive Extension, New Manila, Quezon City, Metro Manila, Philippines.

At first, the limitation of the study was limited to top 100 corporations based on their gross revenue which was stated in Business World magazines, but unfortunately, not all the 100 corporations responded. Some of them are not willing to be surveyed nor interviewed. Out of 100, only 86 corporations responded. In addition, only these 86 companies were accessible and located in Metro Manila. And these are composed of 38 service companies, 12 manufacturing companies and 36 merchandising companies. The respondent also had a hard time to assess the data gathered from the companies. The data gathered was presented in narrative explanation format, this give the proponent a hard time in coding the data.

Another limitation of the study was that there are some uses, perceived advantages and disadvantages of using Expert System and other important details and information were not mentioned or discussed clearly by the interviewee respondent of the corporation. And

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many companies have also claimed that this information is kept confidential by their companies.

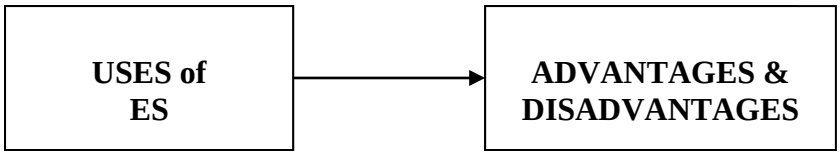
2. FRAMEWORK

2.1 Conceptual Framework

The conceptual framework of the study is based on (or adopted from) R. Kelly Rainer Jr. and Efraim Turban (2009) which states the following :

An Information System (IS) is an organized collection of people, procedures, software, databases, and device used to record completed business transactions (please see figure 1):

Figure 1 : Schematic Diagram of the Conceptual Framework



According to Steven Alter (2009), Expert Systems supports the intellectual work of professionals engaged in design, diagnosis, or evaluation of complex situations requiring expert knowledge in a well-defined area. Also ES have been used to diagnose diseases, configure computers, analyze chemicals, interpret geological data, and support many other problem solving processes.

In addition, Alter stated that these systems may have some repetitive elements; many situations have unique characteristics that must be considered based on elements, many situations have unique characteristics that must be considered based on expert knowledge. Moreover, the common reasons for developing expert systems include preserving an expert's knowledge, improving the performance of less experienced people doing similar tasks and enforcing some consistency in the way people do particular types of work.

ES give the computer ability to make suggestions and act like an expert in a particular field. It can help the beginner user to perform at the level of an expert. The unique value of ES is that they allow organizations to capture and use the wisdom of experts and specialist. ES can be applied to almost any field or discipline. (Reynolds & Stair, 2010)

In a business environment, people are valuable because they perform important business tasks. Many business tasks require expertise, and people often carry this expertise in their heads, often that's the only place it can be found in the organization. Thus, an ES can capture expertise and making it available to those who are not experts so that they can use it, either solve a problem or learn to solve a problem. (Haag & Cummings, 2010)

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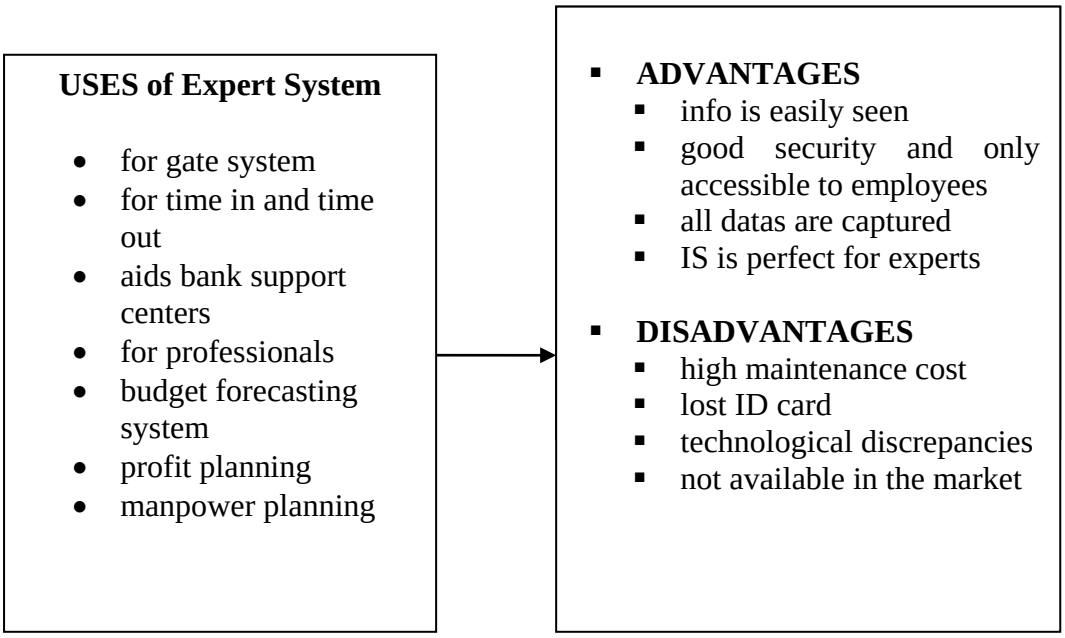
Furthermore, Haag & Cummings (2010) stated the advantages and disadvantages of an ES, due to the nature of ES it can handle massive amounts of information, reduce errors, aggregate information from various sources, improve customer service, provide consistency in decision making, provide new information, decrease personnel time spent on tasks, and reduce costs. However, there three disadvantages of an ES, one is transferring domain expertise to the expert system is sometimes difficult because domain experts cannot always explain how they know what they know. Another disadvantage is even if the domain expert can explain the whole reasoning process, automating that process may be impossible. Lastly, an ES has no common sense or judgement just like humans can do.

2.2 Operational Framework

Adopted from the Conceptual Framework of Reynolds and Stairs (2009), the uses of Expert System, and the perceived advantages / disadvantages by selected top corporations in Metro Manila of using it will serve as the variables of this study in terms of :

Figure 2 : Variables of the study



2.3 Operational Definition of Terms

- *AI –Artificial Intelligence –The science of making machines imitate human thinking and behavior. (Haag and Cummings, 2010)*

- *ES – Expert System – A system that gives the computer the ability to make suggestions and function like an expert in a particular field, helping enhance the performance of the novice user. (Stair & Reynold, 2012)*

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- *CSCWS - Computer Supported Collaborative Work Systems – A more general term for GDSS, it deals with assisting the decision makers via networked computers in making timely decisions (Kendall & Kendall, 2005)*

3. RESEARCH METHODOLOGY

The research methodology and research design of this research study was adapted from the proponent's former research paper "Uses of Information System Among the Top Corporations in Metro Manila" (Ong, 2009). A different set of variables (with regards to GDSS) was chosen in this study.

3.1 Research Design

The research design used was descriptive. The data gathered (survey and interview results) from the respondent companies will be used to discuss and describe the uses of Office Automation System by 86 corporations in Metro Manila namely in the following sectors : Service, Manufacturing and Merchandising.

Among the 100 list of top corporations, only 86 companies responded. 38 companies (or 44.19 %) were Service companies which includes oil refineries, electric distribution, wireless service, banking, power service, port management, media, financial institution, utility, real estate, telecommunications, transportation, infrastructure, water, call center, and insurance companies. 12 companies (or 13.95 %) responded were Manufacturing companies which includes food, automotive, agriculture, beverage and beers, pharmaceutical, pediatric nutrition, cement, packaging companies. And 36 companies (or 41.86 %) were Merchandising companies which includes shopping and retail, supermarket, warehousing, beauty products, LPG and Petroleum companies.

3.2 Sampling Plan

The primary data collected during 1st term Academic Year 2009-2010 from the corporation interviewed by BUSIMIS (Management Information System Class) students as the basis of data for this research study.

3.3 Method of Data Analysis

Primary data was tabulated in a data set, and the data was analyzed using the frequency and percentage distribution. Since the data gathered presented in narrative paragraph form, content analysis will be used by the proponent in coding the data. And the data was presented also in frequency distribution table format and context narrative discussion.

4. RESEARCH FINDINGS

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Based from the Conceptual Framework adapted by the proponents :

The purpose of using the conceptual framework cited in the previous section is to enumerate the applications of Expert System, as well as the perceived advantages and disadvantages of using Expert System by different top companies in Metro Manila. This would also narrate some the information given or stated by the respondents during the data collection.

Table 1: Frequency and percentage distribution results with regards to the uses of Expert System

	Frequency (n = 86)	%
• for gate system	4	4.65 %
• for time in and time out	3	3.48%
• aids bank support centers	1	1.16%
• for professionals	5	5.81 %
• budget forecasting system	1	1.16 %
• profit planning	3	3.48 %
• manpower planning	2	2.33 %

Based on the result findings, only 12 companies or 13.95 % (out of 86 companies) claimed that they are using Expert System (ES). They use ES to provide them important information and decision support techniques which needed to solve specific types of problems. Many companies were using ES for their gate system (4 out of 86 respondents or 4.65 %), for time in and time out (3 out of 86 respondents or 3.48%), to aid bank support centers (1 out of 86 respondents or 1.16 %) , for professionals (5 out of 86 respondents or 5.81 %), to budget forecasting system (1our of 86 respondents or 1.16 %), for profit planning (3 out of 86 respondents or 3.48 %), for manpower planning (2 out of 86 respondents or 2.33 %) .

Based on the information gathered, companies in Metro Manila are more likely to use the Expert System as means of making information more accessible. This allows the company to make it easier for the decision makers to make better decisions as they are more prepared. The Expert System also promotes good security and makes information only accessible to employees. These are the top reasons why companies use the Expert System. By making things more efficient, they are able to make better decisions as information is presented to them faster and more secured. Moreover, companies also mentioned that Expert System enables them to capture all essential data.

Table 2: Frequency and percentage distribution results with regards to perceived advantages of using Expert System

	Frequency (n = 86)	%
▪ info is easily seen	3	3.49 %
▪ good security and only accessible to employees	6	6.98 %
▪ all datas are captured	4	4.65%
▪ IS is perfect for experts	6	6.98%

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In table 2, among the 86 companies who were using ES, it shows that only 12 out of 86 companies (or 13.9 %), stated that using ES makes their info easily seen (3 out of 86 respondents or 3.49%). On the other hand, 6 out of 86 respondents (or 6.98%) mentioned that having ES promotes good security and makes information only accessible to employees. Moreover, some respondents 4 out of 86 respondents (or 4.65%) mentioned that by using ES they are able to capture all data. Lastly, 6 out of 86 respondents (or 6.98%) said that ES is perfect for experts.

The statistics in table 2 show that the companies that are using the Expert Systems are able to their work more efficiently than the others. According to the respondents, ES is designed to mimic the problem-solving abilities of experts in a particular area, once it is operational, it can copied and distributed at little marginal cost to assist users, whether they are experts or inexperienced personnel. They do not necessarily have to be "tailor-made", like the Executive Support System, for the individual user, but can be used by anyone desiring decision support in a specific field. The companies show that with this expert system being applied, managers and other decision makers are able to make better decisions as more information is presented to them. The system allows them to be better connected as an improved synergy allows them to be more effective. By having a central system to help in the decision making, managers will be able to have the information needed in order to make the best decision. The system allows them to become more connected to each other as they are able to make better group decisions.

Table 3: Frequency and percentage distribution results with regards to perceived disadvantages of using Expert System

	Frequency (n = 86)	%
▪ high maintenance cost	3	3.49 %
▪ lost ID card	5	5.81%
▪ technological discrepancies	3	3.49 %
▪ not available in the market	3	3.49 %

In table 3, it displays that 12 out of 86 companies (or 13.9 %) mentioned tha using Expert Systems also has its disadvantage. Expert System requires maintenance which is quite high to 3 out of 86 respondents (or 3.49%) Another disadvantage mentioned by 5 out of 86 companies, (or 5.81%), there is a risk of lost ID Card. Moreover, 3 out of 86 respondents (or 3.49% %) mentioned that using Expert System causes technological discrepancies. Lastly, 3 out of 86 respondents (or 3.49 %) also mentioned that ES is not available in the market.

There are certain disadvantages that companies face when the Expert System is applied to them. As mentioned in table 3, the top disadvantages that companies face are its too complex, the server is down, and the system is useless in certain problems. Not all systems are created perfectly. The Expert System disadvantages are more of people who don’t know how to use it and technical difficulties. The system may be unable to solve certain problems and it forces the company to find a different way in solving it.

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5. CONCLUSION / OBSERVATION

The objectives of writing this research paper is to enumerate some application of Expert System that was adapted by the top corporations in Metro Manila, and mentioned their perceived advantages and disadvantages based on the surveyed from 86 companies, and to disseminate them both in academic and business community.

Expert System (ES) supports both managers and top executives on decision making, and to provide information needed to solve specific types of business problems. The companies in Metro Manila use Expert System to response to the growing concern over the quality and effectiveness of their meetings. The proponent also found out that there's more perceived advantages compared to disadvantages of using Expert System by the top corporations in Metro Manila. Based on proponent's observation, Expert System allows the users to communicate their ideas in a more efficient way. There are problems when group discussions happen such as no agenda, no specific action items, no alternative actions, members come in unprepared, Necessary information is not available on time, the discussions are dominated by only a few people, and people coming in late or absent. By applying Expert Systems, the users will be able to address the problems. By using Expert System, information will be presented to the users in real time. This leads to the user's communication being easier amongst the decision makers. The system is able to provide the group an area for discussion and brainstorming. They will also be able to connect all the users and the decision makers to make decisions at a more efficient rate.

Expert System helps the companies to improve decision making and answer "what-if" questions, especially when considering new situations. They used this to try out different scenarios. It supports the managers to analyze important data and arriving at a final decision. Expert System were developed to solve complex problems and for strategic corporate planning. A well-designed Expert System can be used to different levels of the organizations. Expert System placed emphasis on helping the manager making decision by being at the hub of the decision making process rather than on actually making decisions for the manager.

The proponent would like to quote the statement of Haag and Cummings (2010) that : "An Expert System uses IT to capture and apply human expertise. For problems with clear rules and procedures, expert systems work very well and can provide your company with great advantages. An expert can handle amounts of information, reduce errors, aggregate information from various sources, improve customer service, provide consistency in decision making, provide new information, decrease personnel time spent on tasks and reduce cost." (Haag and Cummings, 2010)

Expert System (ES) arrives at intelligent solutions to user queries by using the rules for formula contained in the system's knowledge based. Knowledge from such a system is extracted from human experts on the subject in which the expert system is expected to specialize. Nowadays, companies are very competitive and dynamic. Thru this, all the companies need to apply Expert System (ES) in able to get ready the employees and managers in the companies to face new challenges in the workplace and to act in response to the system dynamics inside the companies. And most of all, to attain the company's vision and mission, as well as their corporate goals and objectives.

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