Developing Decision Support Capabilities through Use of Management Information Systems

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Abstract: Management Information Systems (MIS) are widely used in big corporations to collect, organize, filter and present data, resulting in more effective decision-making. Through use of MIS, individuals shape the way how they make decisions. In our study, we posit that utilization of MIS in the decision-making process impacts the decision support capabilities of systems. The use of MIS develops speed, quality, and other features of decision-making. Moreover, improvement in decision-making is aimed to ensure customer satisfaction and good business results. All MIS strategies should therefore be tailored in a way that the all business goals are achieved.

Key words: Management information systems, MIS, Decision support capabilities, Decision support

1. Introduction

With the advent of new technology, information has been widely spread and individuals, as well as organizations have got lost in the informational "noise". Therefore, it is essential to know how to work with the noise and bring the information that can assist the decision-maker to make the optimal decision. With the increased information supply, significant leap occurred in information management field as well. The complexity of business situations has led to an increased need of effective decision-making. In recent times, particularly in large sized organizations, Management Information Systems (MIS) are utilized in order to ensure the maximum support to the decision-makers on various operational levels. Increasing volumes of organizational data coming from various valuable sources needs to be properly managed. Technologies of managing information systems have been designed due to need and push by enterprises. Some examples are Customer Relationship Management (CRM), Supply Chain Management (SCM), Enterprise Resource Planning (ERP) and Enterprise Content Management (ECM). These models offer substantial decision support benefits through the use of decision aids that enable the examination of significant volumes of enterprise data (Grabski et.al, 2012). Management Information Systems play a crucial role in providing a wide range of streamlined options from which decision-makers use to make their preferred choices (Vittal and Shivraj, 2008). Good working MIS ensures that whatever choices are made by decision makers, the outcome, more often than not, becomes positive. This, as a matter of fact, is the reason why many decision makers tend to prefer using MIS tools when making tough business choices. As renowned concept, having good decision choices guarantees viable decisions in the businesses (Zsambok and Klein, 2014). MIS is designed to enhance communication among employees, provide an objective system for recording information and support the organization's strategic goals and direction (Kotler, 2006). The benefits of Management Information System are often of critical point in the course of company's business wheel.

A good Management Information System speeds up the process so that the time required to serve a customer can be faster resulting in increased customer satisfaction (Galliers and Leidner, 2014). Improved quantity and quality of information is an important component of business today. Those who control the information can act more responsive to changes and trends of the future. Application and good management of Management Information System generates quality and comprehensive reports from compiled data which eventually benefits the whole organization. Once set up, reporting process can be executed and achieved by computers automatically. It is inevitable that any decision-making

relies heavily on information that supports the policy to be taken with improved quality and quantity management decisions. Winning policies can only be realized if Management Information Systems can provide information that is relevant, accurate, current and timely (Kotler, 2006). Improved quality, responsiveness, awareness on the competitors' condition is the main aspects of today's business intelligence. Actually, these aspects are seen important from a long time with a variety of formats and needs (Snyder and Diesing, 2015). To reach the point of rapid and appropriate response on the dynamics of the competition requires Management Information Systems that can collect, analyze and compile the information needed by decision makers in the company. Improved operational efficiency and flexibility are crucial aspects. Efficient and flexibly operations mean low operational cost to run. This can be achieved after cutting the bureaucracy in the company and implementing good Management Information Systems (Hashem, 2003). Good Management Information System must be supported by reliable electronic data communication network systems for improved internal and external communications. With the application of good Management Information Systems, each party both inside and outside the company can exchange information more effectively and efficiently. Improved quality of planning is an essential process for businesses. However, any plan to be sketched needs the support of adequate information from the practice (Anderson et al., 2015). If this condition is not met, then, the plan may get disoriented and cannot achieve target result. There is also need for control and supervision to achieve improved quality in reports from MIS. If an information system is built, maintained and constantly monitored properly then, any activity within the business environment can be interpreted timely. Monitoring does certainly have an impact on improved control over every procedure and activities occurring within the company.

Increased use of MIS impacts further refinement of decision-making. The skill of choosing an optimal decision or creating a solution can be improved through the use of MIS. However, current literature on MIS rarely adopts a perspective of MIS improving capabilities. Our conceptual study nevertheless employs certain theories to reinforce the use of MIS, because it subsequently enhances decision-making skills, consequently bringing the biggest benefit to the organization. The aim of the study is to find out whether MIS use leads to decision support capabilities. By examining particular MIS use and their relationship to decision support capabilities, we aim to determine which factors companies should consider in management of MIS in order to translate MIS results into optimal decisions. In this sense, our conceptual study is one among few studies exploring the significance of MIS for strategy and decision-making in an organizational context. In the first section, we present the development of MIS to satisfy organizational needs. Next, we explore the concept of decision support capabilities and factors which lead to their development. Finally, use of MIS in developing decision support capabilities is conceived by answering why and how MIS utilization improves decision support capabilities.

2. Role of MIS in improving decision-making

Preliminarily, it is inherent to state that decision-making is an integral part of any business. This is because a majority of operations in an organization revolve around decisions made by the management and other key stakeholders in the organization. And in order for decision to be made adequately, it is vital for there to be a good Management Information System since decisions are based on information available. 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. MIS provides a fitting platform for good decision-making (Kumar, 2006). Essentially, without the established systems of getting information in MIS, it would be extremely difficult for organizations to make their decisions. This is because they would be forced to making baseless information due to the lack of confirmed information. Moreover, MIS normally lays a firm foundation for the establishment of concrete decisions through its systematic tools, timely information and adequate managerial policies and regulations. Furthermore, Management Information Systems' statutes regarding businesses act as guidelines to business owners when making critical decisions about their businesses. As a result, managers and key decision makers are bridled from overstepping their boundaries or exceeding their business mandate. This is very crucial as it helps in keeping businesses checked and balanced thus ensuring that only proven decisions are considered while the untried ones are thwarted. More importantly, the capacity to guide decision-making facilitates progress and improvement of the operations in a company (Lingham, 2013). And in order for decision to be made adequately, it is vital for there to be a good Management Information System since decisions are based on information available. 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. Pettigrew (2014) supports the above observation 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.

2.1 Transaction Processing Systems (TPS)

Transaction Processing Systems (TPS) are designed to handle a large volume of routine, recurring transactions. They were first introduced in the 1960s with the advent of mainframe computers. Transaction processing systems are used widely today. Banks use them to record deposits and payments into accounts. Supermarkets use them to record sales and track inventory (Hashem, 2003). Most managers use these systems to deal with tasks such as payroll, customer billing and payments to suppliers. Some examples of TPS are Payroll Systems, Order Processing Systems, Reservation Systems, Stock Control Systems, Payments and Fund Transfer System. Their role is to produce information for other systems, cross boundaries (internal and external) and they are used by operational personnel in supervisory levels and are efficiency oriented (Galliers and Leidner, 2014). According to Anderson et al., for historical reasons, many of the different types of Information Systems found in commercial organizations are referred as "Management Information Systems". Management Information Systems are management-level systems that are used by middle managers to help ensure the smooth running of the organization in the short to medium term. The highly structured information provided by these systems allows managers to evaluate an organization's performance by comparing current with previous outputs (Kotler, 2006). The role of MIS is to support relatively structured decisions based on internal information flows. They are flexible with little analytical capacity, are mainly used by lower and middle managerial levels. Such MIS deals with the past and present rather than the future and they are mainly efficiency oriented.

3. Developing decision support capabilities

Decision Support Systems (DSS) are a specific class of computerized information systems that support business and organizational decision-making activities (Nel, 2011). A properly designed Decision Support System is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions (Davenport, 2013). Decision support systems (DSS) are interactive information systems that assist a decision maker in approaching ill-structured problems by offering analytical models and access to databases. These systems are designed to support the decision-making process, rather than to render a decision. The hallmark of DSS is flexibility. Personal DSSs should be easy to develop: end-user oriented tools are available for this purpose. On the other hand, an organizational DSS, used throughout an enterprise, should be developed in a well-planned, disciplined process. All DSSs should be easy to use. DSS were introduced in the 1970s and gained mainstream attention in the 1980s (Zsambok and Klein, 2014). Originally run largely on mainframes, they were seen as an evolutionary step of MIS, which at the time were relatively inflexible storehouses of corporate data. In that environment, DSS were high-end applications reserved for occasional, non-recurring strategic decisions by senior management.

For structured decisions, it is possible and desirable to develop computer programs that collect and combine the data, thus, giving the process a high degree of consistency. However, because these tend to be routine and predictable choices, DSS is typically not needed for highly structured decisions. Instead, there are many numbers of automated tools that can make the decision based on the predefined criteria. The principal domain of DSS is support of decision-making for semi-structured problems, where parts of the decision process itself often require very significant computer support. DSSs are also employed to assist a decision maker facing an unstructured problem, often injecting the necessary factual grounding through access to data. Decision-making to solve unstructured problems is available but within a narrow domain. An ill-structured problem contains elements of both semi-structured and unstructured problems (Pettigrew, 2014).There are two principal modes of DSS analysis are available: What-if mode implies developing scenarios for solution with the assistance of information systems (usually decision support systems) and the Goal-seeking mode establishes the input factors necessary to achieve specified goals (usually with a decision support system).Using DSS in the decision-making process consists of four steps. These are: intelligence - a search of the environment is made to find and define the problem or an opportunity, design - several alternative solutions are developed, choice- alternatives are compared to one another during the choosing stage and implementation - solution is implemented and tracked, in order to be improved upon. DSSs have several features to offer in the general Management Information System environment of an organization (Galliers and Leidner, 2014). More specifically, according to Pettigrew, DSS capabilities can: support decision-making in ill-structured situations when problems do not lend themselves to full computerization, help to rapidly obtain quantitative results needed to reach a decision, operate in the ad hoc mode to suit the current needs of the user, support easy modification of models, foster high-quality decision-making, facilitate the implementation of decisions, support group decision-making, be user friendly, give managers the opportunity to gain a better understanding of their business. Like every system there are several

limitations to the decision support capabilities meaning they are limited in their data-handling capabilities and thus cannot work with large databases, they do not allow for construction of more complex models, modifications to spreadsheets are difficult to keep updated when numerous people use them (Motro and Smets, 2012).

4. Use of MIS and improvement in decision support capabilities

The role of Management Information Systems is described and analyzed in light of its capability for decision-making. According to Davenport (2013), the decision-making process and its impact on top level management in a business organization is explained with an emphasis on automated decision-making. Limitations and challenges of MIS are discussed and proposed for increasing the effectiveness of MIS in the decision-making process. MIS has several subsets such as Decision Support Systems and Executive Information Systems. The role of MIS in decision support is best discussed in the context of the subset referred to as Decision Support System (DSS). DSS is a computer based system (an application program) capable of analyzing an organizational (or business) data and then presents it in a way that helps the user to make business decisions more efficiently and effectively (Zsambok and Klein, 2014). It is basically an informational application which depends on the information already input while answering to a given query. For example, a decision support system could provide comparative sales figures for one week/month and the next, projected revenue figures based on new product sales assumptions and consequences of different decision alternatives, given past experience. Sometimes there is an overlap between the broad categories of IS. DSS can be capable of presenting information graphically through an expert system or artificial intelligence (Galliers and Leidner, 2014). Usually, DSS is used by all levels of people within a business organization. Top level management uses DSS for strategic decisions, middle management uses for tactical decision while first line supervisors use it to deploy for day-to-day operational decisions. Therefore, 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 (Al-Zhrani, 2010). DSS are a subset of MIS, for intelligent decision-making. However, despite the immense benefits that result from using MIS in decision-making, some critics have, reportedly, been slowly—but surely—asserting that MIS poses surmountable detrimental effects to organizations and should thus be used sparingly or avoided if possible (Galliers and Leidner, 2014).

4.1 Decision Support Systems (DSS)

Kotler emphasizes that DSS is an interactive computer system that can be used by managers without help from computer specialists. According to Lu (2006), DSS provides managers with the necessary information to make intelligent decisions. DSS has three fundamental components:

-   Database management system (DBMS): Stores large amounts of data relevant to problems DSShas been designed to tackle;
-   Model-based management system (MBMS): Transforms data from DBMS into information that is useful in decision-making;
-   Dialog generation and management system (DGMS): Provides a user-friendly interface between the system and the managers who do not have extensive computer training.

Some examples of DSS are Group Decision Support Systems (GDSS), Computer Supported Co-operative work (CSCW), Logistics systems, Financial Planning systems and Spreadsheet Models. The role of DSS is a support for structured or semi-structured decisions. They have analytical and/or modelling capacity and are mainly used by more senior managerial levels. These systems are concerned with predicting the future. Especially with the arrival of "big data" philosophy, MIS requirements and capabilities have increased. According to Lu (2006), the link between big data and MIS is to ensure a high level of data quality and accessibility for business intelligence and big data analytics applications. Corporations, government agencies and other organizations employ big data management strategies to help them contend with fast-growing pools of data, typically, involving many terabytes or even petabytes of

information saved in a variety of file formats (Anderson et al., 2015). Effective big data management helps companies locate valuable information in large sets of unstructured and semi-structured data from a variety of sources, including call detail records, system logs and social media sites. Effective capturing and storage enabled by the Internet can be translated into optimal business decision encompassing relating, organizing, filtering and retrieval that are imperative for organizations. According to Nel (2011), midway through the first decade of the 21st century, the narrowly conceived idea of MIS has become somewhat fuzzy. Systems are available for computer assisted design and manufacturing (CAD-CAM); computers supervise industrial processes in power, chemicals, petrochemicals, pipelines, transport industries. Systems manage and transfer money worldwide and communicate worldwide (Davenport, 2013). Virtually all major administrative functions are supported by automated system. Many people now file their taxes over the Internet and have their refunds credited (or money owning deducted) from bank accounts automatically. MIS is, thus, the first major system of the Information Age. At present, the initials of IT are coming into universal use. "Information Technology" is now the category to designate any and all software-hardware communications and structures that work like a virtual nervous system of society at all levels (Zimmerman, 2012). According to Pettigrew (2014), upgrading MIS usually begins by identifying some kind of a problem and then seeking a solution.

5. Conclusion

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. 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 (Karimi, 2010). 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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