

The role of information systems in management decision making – an theoretical approach

~ Ph. D. **Mihane Berisha-Namani** (University of Pristina, Kosova)

Abstract: In modern conditions of globalisation and development of information technology, information processing activities have come to be seen as essential to successful of businesses and organizations. Information has become essential to make decisions and crucial asset in organisations, whereas information systems is technology required for information processing. The application of information systems technology in business and organisations has opened up new possibilities for running and managing organisations, as well as has improved management decision making. The purpose of this paper is to give an understanding of the role that information systems have in management decision making and to discuss the possibilities how managers of organisations can make best use of information systems. The paper starts with identifying the functions of management and managerial roles and continue with information systems usage in three levels of decision making. It specifically addresses the way how information systems can help managers reduce uncertainty in decision making and includes some important implications of information systems usage for managers. Thus, this study provide a framework of effective use of information systems generally and offers an alternative approach to investigate the impact that information systems technology have in management decision making specifically.

Keywords: information systems, decision making, management functions, managerial roles.

1. Introduction

Transition from industrial society to information and knowledge society has its impact on social, economic and cultural aspect of life. There are only few aspects of life nowadays which are unaffected by information

technology . In recent years, information systems technology have become crucial and is playing a critical role in contemporary society and dramatically is changing economy and business. Business is conducted in a global environment and simply could not serve without computer based information

systems. Furthermore, we are entering the information age because of information technology and information systems usage. The use of information systems especially is often understood to be changing the way business and organisations work as well as help managers reduce uncertainty in decision making.

It is interesting to note that most authors (Lucey, 2005; Hicks, 1997; Gordon and Olson, 1985; Ward and Peppard, 2002) would agree that information systems are playing an increasingly important role in organisations of all types, regardless of their size. It is often stated that information systems is a tool to help improve management by using available information for decision making. According to Thompson and Beer (2000) in addition to more traditional systems which assist in the day-to-day business operations, information system is increasingly providing a competitive advantage for the organisation. Several studies have found and reported diverse findings regarding information systems usage in decision making (Davis and Olson, 1985; Hicks, 1997; Kumar and Mittal, Jawadekar etc.). We should emphasize that although decision making it is one of the areas that information systems have sought most of all to affect, there have been only a few existing studies that have dealt and examine the role of information systems in management decision making. To place this study in context, we turn to the papers by Lucey et al. (2005) and Haag and Cummings (2006). They noted that information systems support decision making in organisations and vary among managerial levels. Information systems usage to support managers in decision making falls into one of two general categories of systems that help users to analyze a situation and leave the decision up to him/

her and systems that actually make some sort of recommendation concerning what action to take (Lucey, 2005; Haag and Cummings, 2006).

In this paper the focus is to give an understanding of the role that information systems have in managers decision making and to discuss the possibilities how managers of organisations can make best use of information systems. This study provide researchers with a framework of information systems usage in decision making and offers the ways how information systems can help managers reduce uncertainty in decision making. Furthermore, we consider that our study is important since it helps not only to understand the role that information systems have in decision making, but also help to understand how this technology support major components of management and decision making functions. Information systems is especially important to managers at the lower or operational level since it appears that they receive the most aid, since computers and information systems are best able to deal with well-structured problems for which these managers are responsible (Hanić, 1998; Davis and Olson, 1985).

The paper also intends to provide a better understanding of management functions and roles and offers an alternative approach to investigate the role that information systems have in management decision making in organisations. The rest of article is organised as follows. In the following section we provide the functions of management and managerial roles and we then describe information systems and three levels of decision making. Lastly, we conclude our study with a suggestions that although information systems intend to support management decision making and have made great contributions

to organisations, until recently these contributions of information systems have been confined to narrow, transaction processing area. Much work needs to be done in broadening the impact of information systems on professional and managerial life and further research are needed.

2. The functions of management and managerial roles

Information systems claim to support managers, but they cannot be built in business and organisations unless we understand what managers are, what they do and how

they do it. An individual who gets the things done is a manager. It is necessary to distinguish between these tasks of managers and the functions of management. While managing, a manager may perform the activities such as accounting, selling, manufacturing, purchasing etc. These activities are called as tasks and not as functions. The activities that are performed through the managerial function are presented with the classical model of what managers do, espoused by writers in the 1920's such as Henry Fayol who identifies the following functions as the parameters of what managers do: planning, organising, directing (motivating) and controlling (Fig.1).

Fig. 1 - Functions of management



The management process has four functions and is executed through a variety of decisions taken at each function of management (Jawadekar, 13-14). According to Kumar and Mittal planning function of management it is the formulation of what is to be done. Organising function is a means by which human resources, physical assets, money and time are co-ordinated into

efficient production of goods and services. The most vital function of management is directing or motivating function, which calls for the practice of high degree of skills based on sufficient knowledge. While, controlling function as the last stage in management tends to complete the full cycle of the process of management through which managers accomplish results (Kumar and Mittal, 20-22).

Fig. 2 - Functions and tasks of management

Functions of management



As shown in Figure 2, which summarises functions and tasks of management in his planning function management establish goals and develop strategies and tactics. Individuals and groups differ in their approaches to thinking and decision making. Knowing these differences in their organising function managers assign responsibility to individuals and groups. Lead by motivating and communicating in the function of directing (motivating) they evaluate and adjust organisational performance (directing and controlling functions). Information systems as a tool for information processing can support these functions.

The activities of managers is characterised by decision making, which is a critical managerial function (Shajahan and Priyadharshini, 34). Managers need information to take decisions, but also in order to act in a variety of management functions. Therefore, it is usually that information systems are required when organisations grow and management function is performed by people who are specialized and may be removed from day-to-day activities. The attention of managers increases rapidly from one issue to another, with very little pattern. When a problem accrues all other matters must be dropped until it is solved. Therefore, usually there is simply not enough time for managers to get deeply involved in a wide range of issues. Research suggests that a manager's day is characterised by a large number of tasks with only small periods of time devoted to each individual task. Furthermore, Crawford (1997), observed that given the nature of the work, managers tend to rely upon information that is timely and verbal even if this is likely to be less accurate than more formal and complex information systems.

According to Henry Mintzberg cited by Hicks (1997) managers play at least three separate managerial roles: interpersonal, informational and decisional. Information systems can support these roles in varying degrees. Managers need information from different sources in order to facilitate their ability to act in a variety of roles. A manager's interpersonal role flows directly from his authority and status and involves directing and coordinating the tasks to subordinates. Manager should be the best informed individual in the organisation. In informational roles manager gathers and processes large amounts of information as well as distributes information to others in the organisation. Decisional roles include the entrepreneur role, in which manager initiates new projects and makes changes (Hicks, 1997). Information systems have less to contribute in the case of a manager's informational role than for the other two.

3. Information systems and levels of management decision making

The development of information systems technologies has accelerated changes to economy, organisations and in all areas of businesses. Traditionally, information systems were used to support operational functions, with the emphasis on achieving information systems efficiency and effectiveness. Furthermore, the emergence of information systems goes back to the 1950's and 1970's when information systems were mainly transaction applications, named simply because they involved processing accounting transactions. Advances in technology made it possible to access data more quickly and new programming systems helped to develop and refine operating systems, which provided the

organisational data necessary to run an organisation more efficiently on a day-to-day basis. Information systems started to provide reports and information that enabled managers to make more effective decisions and have become tools to support management.

Today, information systems is more complex than in 1970's or even in 1980's, when the emphasis was on operational needs. One reason for this is the recognition that information systems plays different roles in organisations and businesses and help managers reduce uncertainty in decision making (Thompson and Beer, 2000). With the rapid development of information systems technology prior to the 1980's, the role of information systems in businesses and organisations has changed, went out of style and was replaced with the term management information systems which was used to refer to the complete computer based information systems of a organisation (Hicks, 1997). Thus, in the past two decades from it's conventional function of supporting business operations, information systems role emerged as a strategic tool for decision making. This new role is highlighted in several studies (Davenport and Short, 2004; Porter and Millar, 1985).

Lucey (2005) emphasises the decision focus of his definition of information systems. He observed that "information systems is a system to convert data from internal and external sources into information and to communicate that information in an appropriate form to managers at all levels in all functions to enable them to make timely and effective decisions for planning and controlling the activities for which they are responsible" (Lucey, 2005). We consider that his definition express the essence of information systems usage to assist managers in decision making

in three levels of management. Hicks (1997) observed that today, in many businesses the information systems have become a crucial asset and information systems are used extensively not only to support management in decision making, but it may also be designed to provide decisions for repetitive classes of problems (Hicks, 1997).

Nowdays, information systems are the means by which organisations and people, using information technologies, gather, process, store, use and disseminate information (Bocij, Chaffey, Greasley & Hickie, 2003). Whereas, firms are using information systems as a strategic weapon to gain competitive advantages and many business processes are redesigned to take advantages through the use of information technology and information systems (Hicks, 1997).

As noted earlier, decision making is often seen as the centre of what managers do, something that engages most of managers time. In order to take decisions, managers need the right information to serve a wider range of needs. In fact, information has long regarded as a very important aspect of decision making in the business environment because information gives power to decision makers. Combs (1995) pointed out that accurate, rapid and relevant information are considered to be vital to improving performance and competitive advantages of business and organisations (Combs, 1995). On the other hand Lucey (2005) suggests that relevant information is essential to any business decision (Lucey, 2005), and information systems have become an important factor in decision making. A systems approach to managing this demand can be met through information systems.

In fact, it is often stated that an information systems is a tool to help improve

management by using available information for decision making. Underlying this is a number of assumption. Firstly, the aim of an information systems is to produce information for action and secondly that if available, it will be used to facilitate decision making. This implies a relationship between information systems usage and management and decision making. The main job of managers is to make decisions and information produced by information systems is linked to decision making.

Furthermore, information systems are designed to support management activities, in particular better decision making. To understand the relationship between information systems and management decision making, we must look at several studies of well known and leading authors on information systems, such as Lucey (2005), Hicks (1997), Davis and Olson (1985) etc. who found that decision making is a complex process and managers are involved in a complex and diverse contacts with customers, competitors, colleagues, government officials, and so forth. They should be able to define the type of information they need and require in each level of decision making. Managers should understand too what information systems is, and what information systems can and cannot do in order to help their organisation succeed (Haag, Baltzan and Philips, 2006).

Decision making is a complex process involving many variables that we do not yet fully understand. However, many aspects of business decision making are clear and business decisions take place at each level of management in an organization although there are different characteristics at each level within organization. Gorry and Morton (1989) provide a useful framework for exploring the nature of managerial work

that includes an understanding of both the purpose of management activity (involving planning and control at strategic, tactical and operational levels) and the way in which managers solve problems and make decisions (Gorry and Morton, 1989). Decision making can be divided or distinguished from one another into three types: strategic, tactical (or control) and operational. Information are required at three different levels of management decision making and information systems has to support each level of decision making.

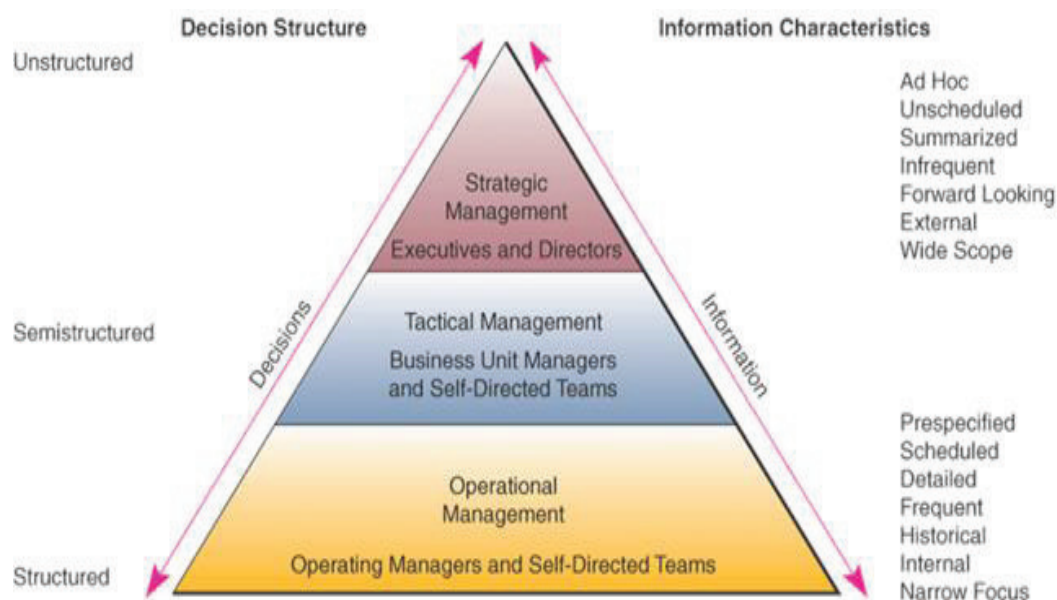
Decision making is an integral part of management and occurs in every function and at all levels of decision making. Decision making is based in information. Information is needed to define and structure the problem, to explore and choose between the alternative solutions and to review the effects of the implemented choice. Figure 3, summarises the main characteristics and information requirements of the three levels of management decision making.

The strategic level of management decision making occupies long term horizons of decisions. Strategic management (executives and directors) is responsible to develop organizational goals, strategies, and policies as part of a strategic planning process. Decision making is much more dependent on human factors and judgement. At the tactical level of management decision making managers and business professionals in self-directed teams develop short and medium range plans, schedules and budgets and specify the policies, procedures and business objectives for their subunits. At the operational level of management decision making decisions are short term and managers or members of self-directed teams have clear objectives and decision rules and develop short-range plans such as weekly production schedules.

Individuals make two general types of decisions: structured or programmed decisions and unstructured or nonprogrammed decisions. According to Lucey, (2005), Hicks (1997) and Davis and Olson (1985), in a programmed decisions the rules for making the decisions are explicit and decision can be specified in advance. The term does not necessarily mean that the decision is automated, although many programmed decisions

are automated. Nonprogrammed decisions deal with nonrepetitive and nodefined problems, and require human decision making. Nonprogrammed decision has no decision procedure, either because the decision is too infrequent to justify the organizational cost of preparing a decision procedure or because the decision procedure is not understood well enough (Lucey, 2005; Hicks, 1997; Davis and Olson, 1985).

Fig. 3 - Levels of Management Decision Making



4. Conclusions

Information systems form an integral part of modern organisations and businesses and are designed to support management activities, in particular, better decision making. Management has four distinct functions and each requires support from an information systems, as well as information are required at three different levels of decision making and information systems has to support each level. Although, effective use of information systems in management decision making

gives power to managers and help organisation succeed, it is necessary to claim that there is not enough empirical studies and results that examine the role of information systems technology in decision making and much work needs to be done in broadening the role of information systems on professional and managerial life.

Finally, it is possible to state while information systems have made great contributions to organisations, managers should rise their understanding what information systems is, and what information systems

can and cannot do. Today, understanding the role of information systems as information processor has on an organisation, is crucial to

running a successful business. In the future information systems can be absolutely crucial to business survival.

REFERENCES:

1. **Berisha-Namani, M.** (2004): *Sistemi Informatik i Investimeve*, Prograf, Prishtinë, Kosovë.
2. **Bocij, P.; Chaffey, D.; Greasley, A. and Hickie, S.,** (2003): *Business Information Systems, Technology, Development and Management for the e-business*, 2nd Edition, England.
3. **Crawford, I.M.** (1997): *Marketing Research and Information Systems* (Marketing and Agribusiness, Text – 4) Available at URL: [<http://www.fao.org/docrep/W3241E/w3241e0a.htm>]
4. **Combs, R. M.,** (1995): *Information Systems for Business Management*, Pitman Publishing, Great Britain.
5. **Davenport, T.H., and Short, J.E.** (2004): *The new industrial engineering, Information technology and business process redesign*. Management Review, 31, 4, pp.11-27.
6. **Gordon, B. D. & Olson, M.H.** (1985): *Management Information Systems, Conceptual Foundations, Structure and Development*, 2nd Edition, McGraw Hill Book Co, USA.
7. **Gorry, G. & Scott Morton, M.** (1989): *A framework for Management Information Systems*, Management Review, Vol. 49.
8. **Haag, S.; Baltzan, P. and Phillips, A.** (2006): *Business Driven Technology*, McGraw-Hill, New York.
9. **Haag, S. & Cummings, M.** (2006): *Essentials of Information Systems*, McGraw-Hill, New York.
10. **Hanić, H.** (1998): *Marketing Informacioni Sistem*, Za menadžere, Beograd.
11. **Hicks, O. J.** (1997): *Management Information Systems*, 3rd Edition, USA.
12. **Jawadekar, J.W.,** *Management Information Systems, Text and Cases*. Available at: URL: [<http://books.google.com/books/>] Accessed: 12.06.2008
13. **Lucey, T.** (2005): *Management Information Systems*, 9th Edition, Thomson Learning, London.
14. **Kumar, N., & Mittal, R.**: *Management Information Systems*, New Delhi, ISBN-81-261-1675-7. Available at URL: [<http://www.books.google.com/books/>]. Accessed: 25.10.2006.
15. **Thompson S.H. and Bee, L.T.** (2000): *Information Systems Orientation and Business Use of the Internet: An Empirical Study*, *International Journal of Electronic Commerce*, Vo.4, No.4, pp.105-130. 30. Available at URL: <http://www.bsad.uvm.edu/Academics/Concentrations/MIS.htm>. Accessed 18.02.2010.
16. **Porter, M.E., and Millar, V.E.** (1985): *How information gives you competitive advantage*, Harvard Business Review, 63, 4, pp.149-161.
17. **Shajahan, S., & Priyadharshini, R.**: *Management Information Systems*, New Age International Publishers. New Delhi, ISBN-81-224-1549-0. Available at URL: [<http://www.books.google.com>]. Accessed: 12.06.2008.
18. **Ward, J. and Peppard, J.** (2002): *Strategic Planning for Information Systems*, Wiley Series in Information Systems, 3rd Edition, UK.
19. **O'Brien, J. and Marakas, G.** (2007): *Management Information Systems with MISource*, 8th Edition, Boston.
20. URL: [<http://omis697.wikispaces.com/Strategic+Information+Systems>]. Accessed: 04.08.2008.