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Jaffar Alalwan

Virginia Commonwealth University, alalwanja@vcu.edu

Heinz Roland Weistroffer

Virginia Commonwealth University, hrweistr@vcu.edu

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DECISION SUPPORT CAPABILITIES OF ENTERPRISE CONTENT MANAGEMENT: A FRAMEWORK

Jaffar Alalwan

Virginia Commonwealth University
alalwanja@vcu.edu

Roland Weistroffer

Virginia Commonwealth University
hrweistr@vcu.edu

ABSTRACT

Enterprise content management (ECM) systems help firms deal with the increasing amounts and complexity of structured and unstructured organizational data. However the ECM literature shows that many organizations focus on the short-term benefits of ECM while the potential strategic decision-making benefits are rarely considered. Therefore, the objective of this research-in-progress paper is to investigate the association between ECM and decision support and to draw attention to the potential application of ECM technology for decision-making activities. This study introduces a framework linking ECM to decision-making activities, and presents five propositions based on the published literature.

Keywords

Enterprise content management, decision support, content lifecycle

INTRODUCTION

As the business environment is getting ever more complex and competitive, the requirement of good and timely decision-making is becoming increasingly evident, and the employment of decision support (DS) technology is becoming not only desirable but also essential. DS technology can reduce uncertainty and increase efficiency in the decision-making process, and much research has been published focusing on the efficiency and effectiveness of DS systems (Arnott 2004; Arnott and Pervan 2005). DS technology encompasses many types of systems, including decision support systems (DSS) in its original and narrow sense (Sprague 1980), expert systems (ES) (Luconi et al. 1986), executive information systems (EIS) (Watson et al. 1991; Singh et al. 2002), and group decision support systems (GDSS) (DeSanctis and Gallupe 1986). In addition, there are hybrid systems and newer types of DS technologies, often developed and designed around specific problem contexts, including systems that make use of knowledge management (KM) techniques (Oppong et al. 2005; Anderson-Lehman et al. 2004). For example, by using a knowledge-based approach, Zack (2007) showed how the organizational and technological DS systems are linked to solve knowledge-based problems.

Enterprise content management (ECM) systems are implemented in many organizations to deal with the increasing information overload and with the complexity of the structured and unstructured organizational data. ECM has many definitions; for instance, the ECM Association (AIIM) defines ECM as “the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists” (www.aiim.org). ECM is also defined as “the strategies, tools, processes and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle” (Smith and McKeen 2003, p.648). ECM can be viewed as an evolutionary phase of information management that involves the management of structured and unstructured content through the complete content lifecycle (Boiko 2002). There appears to be a consensus in the published research that ECM is not only a practical set of technologies but also includes organizational concepts that involve many business perspectives (Blair 2004; Munkvold et al. 2006; Tyrväinen et al. 2006; Brocke et al. 2008). Rocky (2006) reported that one of the main goals of ECM implementation is to have transparent content sharing by making different and disparate applications (i.e. web content management, records management) interoperable. Shared transparent content that facilitates cross-departmental collaboration, can facilitate the capturing of knowledge and content (Jenkins, 2004).

There is considerable overlap between the concepts of ECM and KM; in fact, some researchers consider ECM a subfield of KM, or view ECM as one specific tool of KM (Nordheim and Päiväranta 2006). Tyndale (2002) defined Knowledge management tools as the tools that “promote and enable the knowledge process in order to improve decision-making” (p.183); he mentioned the following as some examples of KM tools: intranet, content management, document management, and web portals. Duffy (2001), Lee and Hong (2002), and Carvalho et al. (2001) suggested that ECM is one type of KM. Traditional documents and data, corporate internet and intranet sites, extranets and external sources, are some examples of

the enterprise content. ECM allows organizations to simplify managing heterogeneous data and to process structured, and unstructured information (O'Callaghan and Smits 2005) that are essential for the decision-making process.

Published research on ECM so far is very limited and reports on ECM implementations have been scarce until recently (Tyrväinen et al. 2006). However, the little available ECM literature shows that many organizations using ECM focus on short-term benefits while strategic decision-making benefits are rarely considered. Smith and McKeen (2003) found that short-term benefits (i.e. cost reduction and work process simplification) are the usual initiators for ECM adoption. Published research has focused on analyzing the impact of ECM on organizational performance based on efficiency or content availability (Brocke et al. 2010). The long-term decision-making and competitive intelligence benefits have not been primary considerations for ECM adoption.

Many organizations desire to do more with the data and information content at their disposal. For example, many firms would like to utilize the enterprise content to generate knowledge; however, in practice, less than 10% of firms analyze their transaction data to help in decision-making (Davenport et al. 2001). As potential long-term benefits of ECM, the capacity for decision-making support is not utilized to any great extent, and there appears to be strong need to investigate the DS capabilities of ECM. Smith and McKeen (2003) write that 'very few' firms utilize ECM to analyze the content to provide decision-making information to be used to make informed decision, and thus to help in generating business value.

Thus, the main objective of this research-in-progress paper is to look into the association between ECM and DS so as to identify the potential effects of ECM technology on DS activities. To achieve this objective, we will link ECM to decision support activities based on the sequential framework of Mintzberg et al. (1976). Ultimately, this research will help improve our understanding of the less obvious DS capabilities of ECM. Further, we present several propositions based on the published literature, to illuminate that association. The rest of this paper is arranged in four sections. The activities of enterprise content management (ECM) are discussed in the following section. Next, we discuss the activities in DS systems. We then introduce our ECM-DS capabilities framework and our propositions. We conclude by summarizing the main findings, the limitations, and future research directions.

ACTIVITIES OF ENTERPRISE CONTENT MANAGEMENT (ECM)

Although ECM is an emerging field and still considered in its infancy (Nordheim and Paivarinta 2006), there have been several studies that focused on ECM development and deployment. O'Callaghan and Smits (2005) distinguish ECM from related approaches and presented a framework for ECM strategy development, pointing out the need for DS. Brocke et al. (2010) found that long-term benefits such as supporting decision-making and competitive intelligence are not considered to be driving forces for ECM implementation. Reimer (2002) finds that business process efficiency may be enhanced greatly by applying integrated ECM. Scheepers (2006) suggested a model to aid user segmentation and personalization during the development process of enterprise portals, with preliminary evidence of usefulness of such ideas based on two case studies. Päivärinta and Munkvold (2005) presented a content model for ECM providing an integrated perspective on information management. Arnold (2003) found that many localized content management projects end with rising costs and confusion. Chambers (2007) concluded that ECM is an important topic of IS research, and it is important to have guidelines for business process management and ECM integration. As one type of ECM, corporate portals include DS and collaborative processing functions (Dias, 2001). According to Kuechler and Vaishnav (2006), the main function of ECM is to "manage and support decision making from unstructured text" (p.962).

ECM systems enhance organizational processes by providing essential services such as capturing, creating, indexing, searching and accessing, organizing, and maintaining content (Reimer 2002; Smith and McKeen 2003). ECM may be of different types or have various components; Smith and McKeen (2003) classified ECM systems (or components) into three types: internal portal for company materials, information searching, and web content management. Web content management, for example, is a survival strategy for almost all organizations (Williams 2001). An organization's performance is significantly impacted by effective "content stewardship" using the right information technology (Marchand et al. 2000). Looking at ECM as content stewardship, activities start with collecting the content (capture). According to Marchand et al. (2000), organizations should capture not only the content that facilitates operational activities, but also the content that may be used for business intelligence (i.e. market shifts, competitive innovation, economic changes, potential problems). The next activity of content stewardship is organizing the content to make it easily navigable (organize). The third stewardship activity is analyzing the content to help in decision-making (process), however only few firms analyze the content to improve decision-making. "In the rush to use computers for all transactions, most organizations have neglected the most important step ... the human realm of analyzing and interpreting data and acting on the insights" (Davenport et al. 2001, p.121). The fourth content stewardship activity is keeping content up-to-date (maintain); the content should be assessed regularly by humans to determine whether it continues to meet the dynamic needs of the organization (Meyers 2002; Arnold 2003). The 'maintain' activity is important to the other three activities because it is responsible for updating the content that allows for

another content lifecycle. The last activity of content stewardship may include establishing standards for retention and disposal. The left side of figure 1 shows the content lifecycle with some of the ECM components.

ACTIVITIES OF DECISION SUPPORT (DS)

DS activities involve getting useful information to decision makers to help them in making decisions. DS activities are widely discussed in the literature. For example, Walker et al. (2003) investigated those activities from the ‘uncertainty’ point of view and specified policy analysis, integrated assessment, and risk assessment as DS activities. Howard (1988) defines three essential decision activities and calls them the decision base: choice, information, and value. In this paper we adopt the sequential framework of Mintzberg et al. (1976), as it appears to be most useful for investigating the decision process (Molly 1995), is widely accepted, and has much empirical support (Mazzolini 1981; Shrivastava and Grant 1985). The sequential framework consists of three phases: identification, development, and selection. Each phase is described in terms of several ‘routines’. The right side of figure 1 shows these three phases, with the dotted arrows on the far right indicating that the decision maker may return to a previous phase as needed.

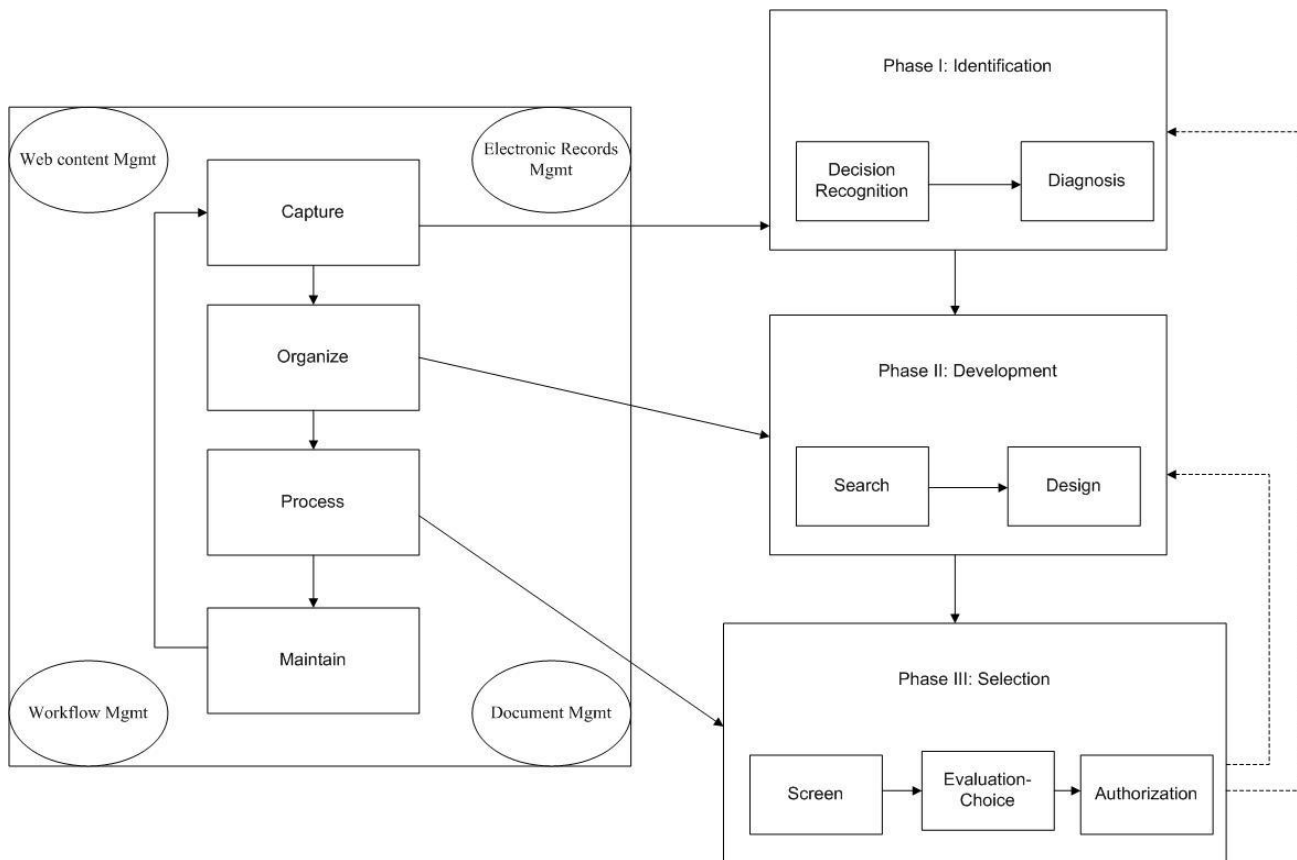


Figure 1: Content Lifecycle (Left) and DS Activities (Right)

ECM-DS CAPABILITIES FRAMEWORK

We argue that ECM systems in general (i.e. ECM components, content lifecycle) have DS activities as depicted in figure 1. The following subsections explain the associations between ECM and DS activities in detail.

Phase I: Identification

The identification phase consists of two routines, the first one being ‘decision recognition,’ which initiates the DS process by recognizing problems, opportunities, and crises. The second routine is ‘diagnosis,’ which refers to collecting the needed data or information to define and clarify the previously recognized problem, opportunity, or crisis. The content lifecycle plays a major role in this stage. Vital information about the enterprise can be gained through capturing the unstructured data (Reimer, 2002). For example, data collection through ‘capturing’ the content is essential to define the problem; ECM components such as web portals, are very useful in recognizing and defining the problem (Ackland et al. 2006). According to Marchand et al. (2000), content capturing includes collecting business intelligence that involves identifying crucial economic, political, and

social problems, changes in customer demands, changes of market trends, and potential problems that may occur with business partners. Such information will come from a variety of internal and external sources rather than a single source. ECM use can help in identifying business opportunities (i.e. productivity savings, reduced customer service costs, improved content quality, increased social networking, reduced cost of compliance) to improve competitiveness in the market place (EMC Corporation 2006). Implementation of content management systems (CMS) helped Volvo Group become more competitive by providing more accurate information content (e.g. continually updated content and employee contributed content), facilitating quick responses to any changes (Karlsson and Gennas 2005). Thus we state the following proposition:

P1: the use of ECM systems in the DS identification phase leads to clearer problem/opportunity definitions

Phase II: Development

The development phase also has two routines. The first one is the search routine where the decision makers apply different search activities to explore alternative solutions to the recognized problem. The second is the design routine where a new solution is suggested, or solutions that are identified in the search routine are modified to fit the specific problem situation. One type or component of ECM is information searching (Smith and McKeen 2003), which facilitates getting the right information to find potential solutions to the problem. The 'organize' activity of ECM also facilitates searching since it involves indexing and connecting content to databases (Marchand et al. 2000). Organizing content is accomplished through taxonomy and metadata, which facilitate variable analysis. As an ECM strategy, taxonomy allows users to find relevant data quickly (Kemp 2007). Corcoran (2002) suggested that taxonomy, which involves classifying content by keywords, is an essential step in organizing content. Metadata, which is data about content and its location, provides the pathway to the content, similar to a 'card catalog' that specifies the location of a library book (Lee et al. 2001). Sykes et al. (2009) argued that content management systems are able not only to organize but also to create better information access. Thus, we state the following proposition:

P2: the use of ECM systems in the development phase leads to identifying and analyzing a larger number of alternatives

Phase III: Selection

The selection phase starts with a screening routine, which is activated to eliminate any impractical alternatives. Next, the best alternative is selected through a process of analysis in the evaluation-choice routine. Finally, the decision goes through the authorization routine, involving an authorized decision maker, in case the individual controlling the DS process does not have the required authority to take the organization to a specific course of action. On the ECM side, the definition of 'process' activity includes analyzing the content, which helps in selecting the best alternative in the shortest possible time. For example, Kettinger et al. (2003) reported that one company, Skandia Group, did very well in analyzing the content to select the best decision alternative by using ECM systems that helps in turning human capital (i.e. skills and experience) into structural capital (i.e. customer relationships). Processes of content management systems, such as defining, standardizing, storing, and delivering, usually enable more effective management (Guenther 2001; Sykes et al. 2009). Kemp (2007) reported that respondents found the primary benefit of ECM in reducing the time looking for content. The content management systems (CMS) at Volvo Group enhance the efficiency of business processes (Karlsson and Gennas 2005). The shared-service content management system in Virginia helped in reducing the time and cost of solving 'records retention issues' (Joha and Jannssen 2010). Thus, we state the following propositions:

P3: the use of ECM systems leads to higher quality decisions

P4: the use of ECM systems reduces the time in making decisions

The user plays a major role in ECM systems (Davenport et al. 2001) as well as in DS activities (DeSanctis and Gallupe 1987). Shang and Seddon (2002) argue that ECM systems have a potential impact on improving employees' satisfaction due to better work efficiency. ECM adoption is one method that can improve the organization's efficiency and increase workers' satisfaction (Andersen 2008). ECM technology is also applied in the medical field: Päiväranta and Munkvold (2005) found that ECM implemented at Johns Hopkins University Hospital satisfies both physicians and patients. So we may assume that ECM positively affects the decision makers' satisfaction, and we postulate:

P5: the use of ECM systems leads to higher satisfaction of decision makers

CONCLUSION

Understanding the relationship between ECM and DS is crucial to identifying and utilizing the potential benefits of ECM technologies for DS activities. This research is an attempt to analyze this relationship. Based on a review of the literature, the paper calls attention to the DS capabilities of ECM. A framework that describes the relationship, as well as several

propositions are presented, to direct future research. The paper encourages researchers to further investigate the DS capabilities of ECM, and it encourages practitioners to focus on the DS capabilities when implementing ECM.

The main limitation of this work is that what we have presented here is based on a literature review and has not been empirically validated. In future research, we plan to test the propositions in a real organizational setting. It is also important to note that ECM systems differ with respect to the installed components (i.e. web content management, workflow management); we discuss the ECM capabilities in general and the DS capabilities may vary according to specific implementations.

REFERENCES

1. Andersen, R. (2008) The rhetoric of enterprise content management (ECM): Confronting the assumptions driving ECM adoption and transforming technical communication, *Technical Communication Quarterly*, 17, 1, 61-87
2. Anderson-Lehman, R., Watson, H. J., Wixom, B. H., and Hoffer, J. A. (2004) Continental Airlines flies high with real-time business intelligence, *MIS Quarterly Executive*, 3, 4, 163-176
3. Arnold, S. (2003) Content management's new realities, *Online*, 27, 1, retrieved December 5 from <http://www.infotoday.com/online/jan03/arnold.shtml>
4. Arnott, D. (2004) Decision support systems evolutions: framework, case study, and research agenda, *European Journal of Information Systems*, 13, 4, 247-259
5. Arnott, D., and Pervan, G. (2005) A critical analysis of decision support systems research, *Journal of Information Technology*, 20, 2, 67-87
6. Blair, B.T. (2004) An Enterprise Content Management Primer, *Information Management Journal*, 38, 64-66
7. Boiko, B. (2002), Content Management Bible, Hungry Minds, New York
8. Chambers, B. (2007) BPM: How does IT fit into an ECM strategy? *AIIM E-DOC Magazine*, 36-39.
9. Corcoran, M. (2002) Taxonomies: hope or hype? *Online*, 26, 5, 76-78
10. Davenport, T.H., Harris, J.G., De Long, D.W., and Jacobson A.L. (2001) Data to knowledge to results: building an analytic capability, *California Management Review*, 43, 2, 117-138
11. DeSanctis, G. and Gallupe, R.B. (1987). A foundation for the study of group decision support systems, *Management Science*, 33, 5, 589-609
12. Dias, C. (2001) Corporate portals: a literature review of a new concept in information management, *International Journal of Information Management*, 21, 269-287
13. EMC Corporation. (2006). When content matters: building the business case for enterprise content management, retrieved December 5, from <http://www.e-hospitality.com/download.mvc/When-Content-Matters-Building-The-Business-Ca-0002>
14. Farbey, B., Land, F., and Targett, D. (1993) How to Assess your IT Investment: A Study of Methods and Practice, Oxford: Butterworth-Heinemann Ltd
15. Jenkins, T. (2004) Enterprise Content Management: What you Need to Know, OT: Open Text Corporation
16. Joha, A., and Janssen, M. (2010) Content management implemented as shared service: a public sector case study, *IFIP Advances in Information and Communication Technology*, 334, 138-151
17. Karlsson, T., and Gennäs, J.B. (2005) Content management systems – Business effects of an implementation, *Master Thesis in Informatics*, IT University of Göteborg, Göteborg University, and Chalmers University of Technology, Göteborg, Sweden
18. Kemp, J. (2007) A Critical analysis into the use of enterprise content management systems in the IT Industry, retrieved December 3, from www.aiimhost.com/whitepapers/JamesKemp_ECMReport.pdf
19. Kettinger, B. and Paddack, K. (2003) The case of Skandia: a knowledge based view of I/T value, Advanced Practices Council of the Society for Information Management, January
20. Lee, H.T. Kim, Kim, J. (2001) A metadata oriented architecture for building data warehouse, *Journal of Database Management*, 12, 4, 15-25.
21. Luconi, F.L., Malone, T.W., and Scott Morton M.S. (1986). Expert systems: the next challenge for managers. *Sloan Management Review* 27(4)

22. Marchand, D., Kettinger, W., and Rollins J. (2000) Information orientation: People, technology and the bottom line, *Sloan Management Review*, 69-80
23. Meyers, J. (2001) Automatic categorization, taxonomies, and the world of information: can't live with them, can't live without them, *E-doc*, 16, 6, 20-21
24. Michael H.Z. (2007) The role of decision support systems in an indeterminate world, *Decision Support Systems*, 43, 4, 1664-1674
25. Munkvold, B.E., Päivärinta, T., Hodne, A.K., and Stangeland, E. (2006) Contemporary issues of enterprise content management: the case of Statoil, *Scandinavian Journal of Information Systems*, 18, 69-100
26. Nordheim, S. and Päivärinta, T. (2006) Implementing enterprise content management: from evolution through strategy to contradictions out-of-the-box, *European Journal of Information Systems*, 15, 648-662.
27. O'Callaghan, R., and Smits, M.A. (2005) Strategy development process for enterprise content management, *Proceedings of the 13th European Conference on Information Systems*, Regensburg, Germany, 1271-1282
28. Oppong, S.A., Yen, D.C., and Merhout, J.W. (2005) A new strategy for harnessing knowledge management in e-commerce, *Technology in Society*, 27, 3, 413-435
29. Päivärinta, T., and Munkvold B.E. (2005) Enterprise content management: an integrated perspective on information management, *Proceedings of the 38th Hawaii International Conference on System Sciences*, IEEE Computer Society, Big Island, HI, USA
30. Reimer, J.A. (2002) Enterprise content management, *Datenbanken Spektrum*, 2, 4, 17-35
31. Rockley, A. (2006) Content management 2006: market directions and trends, The Rockley Bulletin.
32. Scheepers, R. (2006) A conceptual framework for the implementation of enterprise information portals in large organizations, *European Journal of Information Systems*, 15, 635-647
33. Shang, S. and Seddon, P.B. (2002). Assessing and managing the benefits of enterprise systems: the business manager's perspective, *Information Systems Journal*, 12, 4, 271-299.
34. Singh, S.K., Watson, H.J., and Watson, R.T. (2002) EIS Support for the strategic management process, *Decision Support Systems*, 33, 1, 71-85
35. Smith, H.A. and McKeen J.D. (2003) Developments in practice VIII: enterprise content management, *Communications of the Association for Information Systems*, 11, 647-659
36. Sprague, R.H. (1980) A framework for the development of decision support systems, *MIS Quarterly* 4, 4, 1-26
37. Sykes, T.A., Venkatesh, V., and Gosain, S. (2009) Model of acceptance with peer support: a social network perspective to understand employees' system use, *MIS Quarterly*, 33, 2, 371-393
38. Tyndale, P. (2002) A taxonomy of knowledge management software tools: origins and applications, *Evaluation & Program Planning*, 25, 2, 183-190
39. Tyrväinen, P., Päivärinta, T., Salminen, A., and Iivari, J. (2006) Characterizing the evolving research on enterprise content management, *European Journal of Information Systems*, 15, 6, 627-634
40. vom Brocke, J., Simons, A., and Cleven, A. (2008) A business process perspective on enterprise content management: towards a framework for organisational change, *Proceedings of the 16th European Conference on Information Systems*, Galway, Ireland, 1680-1691
41. vom Brocke, J., Seidel, S., and Simons, A. (2010) Bridging the gap between enterprise content management and creativity: a research framework, *Proceedings of the 43rd Hawaii International Conference on System Sciences*, IEEE Computer Society, Koloa, Kauai, HI, USA, 1-10
42. Watson, H.J., Rainer, R.K., and Koh, C.E. (1991) Executive information Systems: a framework for development and a survey of current practices, *MIS Quarterly*, 15, 1, 13-30
43. Zack, M.H. (2007) The Role of Decision Support Systems in an Indeterminate World, *Decision Support Systems*, 43, 4, 1664-1674