The effect of business intelligence on management accounting information system

Seyyed Hamid Tamandeh*
AllamehTabataba'i University
*E-mail: H_mahmode@yahoo.com

Abstract

In today's business world, we are faced with high volumes of data. New developments in IT provide organizations with effective and efficient access and storage of information. In any case, there is a long distance between the mass of data and its use. Management accounting information system has changed as a key to success in today's business environment. In the field of management accounting, if the accounting information system is not capable of providing information to business managers timely and quickly, organizations' success will be threatened in the competitive environment. To cope with competitors and growth of long-term strategies, the accounting information system should benefit from business intelligence techniques to provide timely and effective financial information. The important competitive advantage against opponents and business competitors in the market is the most important reason to create intelligent systems. The purpose of business intelligence is to help control the flow and resources of business information within and around the organization. In this study, based on the research objectives, using a meta-analysis, some of the applied criteria and parameters of accounting information systems were examined based on business intelligence features. In addition, a model was proposed based on four categories of relationships and inferences, warning and reporting systems, and tools for effective analysis and decision-making. Among the criteria in the literature review are group decision-making, optimization, integration, simulation, traffic reports, prototyping based on the original version, two-way argument process, awareness technology, informing on the content, fuzzificatio, data mining, data storage, real-time analysis process, establishing communication channels, creating intelligent factors etc. Therefore, the necessity to use a business intelligence-based model in management accounting information system is proposed.

Keywords: business intelligence, information systems, management accounting

Introduction

Technology will start a new era in marketing processes thanks to tools such as information storage, and the use of satellite services and multidimensional databases. Previous mass marketing processes will also find ways toward new strategies and the market will provide services to certain groups of purchasers. This information is used for decision making, planning of activities and transforming data into business intelligence (BI) using IT tools. Nowadays, accountants can help their companies in extracting BI, planning and controlling of marketing activities. Debbie Bliss, director of a marketing project in says, "Knowledge is power" suggesting that today's technology has a unprecedented ability to collect information on sales activity. "The real value of information arises from transforming stored information to intelligence and it application to develop a strategy, is a customer-orientation approach."

To collaborate on marketing activities, accountants and financial managers consider the move to a customer-oriented approach in four areas of activity. First, necessary information such as financial data should be identified, since accountants are familiar with collected financial data. The second is that in many cases the information could be collected, since large multi-dimensional databases have prepared the necessary data in advance. Third, the data can be studied using advanced analytical techniques and finally, using the information the program of activities could be set. These four areas, will transform information activities into BI. Financial professionals can act as either consulting directors of marketing for cost-gain control or observers. In this new role accountants gain access to information stored in the database; thus attention should be paid to privacy issues around common information (Fordham et al., 2002).

In recent decades, the concept of knowledge management has emerged, and organizations have become aware of the role of human capital and knowledge so that having such assets organizations may perform better commercial operation and assistance, storage, marketing and distribution of knowledge, regardless of its appearance. Relying on years of study and exploring the laws, books, articles etc. of intelligent systems, experts have been able to apply tools needed for specialized storage based on applied knowledge and as a step in knowledge management systems. Today, having a computer and accounting software people can fully record all transactions and prepare accounting and financial reporting needed. However, the truth is that this is not accounting but a book keeping operation. Accounting requires a high degree of expertise and professional judgment for proper evaluation of all the facts and solving problems clearly. Storing information and having specialized knowledge in an intelligent system that does not vanish, and faces less trouble, will keep you in the competition and seems to provide appropriate responses for experts and decision makers. Professional accountants can reliably use an intelligent system because it helps them solve their potential problems and easily perform their duties. Intelligent systems can solve their tasks and perform their duties easily.

Significance of the Problem

Accounting systems are pre-fabricated packages provided by suppliers in order to meet standard requirements in a wide range of organizations. These systems have been designed and produced in areas such as management accounting, financial accounting, stocking, salaries and wages, or even organizational resource planning. Hundreds of national and international suppliers supply their various products in response to the needs of businesses and organizations, thus today organizations are faced with evaluation and selection of an appropriate accounting information system to appear as contributing to BI and decision support according to organizational needs such as good performance. To solve this problem and create competitive advantage, it is necessary to carefully select an appropriate management accounting information system (MAIS) with levels of decision support and BI. Therefore, to evaluate the effectiveness of such systems based on decision support and BI in the field of management accounting information it is essential to practically determine appropriate criteria for this evaluation.

Today, in Iran and many developing countries, chief financial officers and IT managers are facing a new challenge due to the emergence of attitude to providing competitive advantage for using accounting systems. The challenge is to select the system and comprehensive accounting information software tailored to the organization covering the needs of financial beneficiaries in the form of higher profits acquisition. In the past, probably, organization paid more attention to the automation functions, processing mechanization and data storage and therefore standards focused on this issue and appropriate evaluation methods were used to select accounting information systems.

Today, with the introduction of strategic features of IT and value of data,BI has become a necessary concept.

Therefore, MAIS's should be designed based on decision support and BI in addition to mechanization. This requires scientific research in the field of decision-making needs of systems and accounting software applications in terms of decision support and BI, as well as the examination of organizations' success in selecting appropriate information systems.

According to research in this area, it seems that Accounting Information System(AIS) is the perfect place for research studies in the subject area of IT, thus through examining previous research the following points could be inferred in order to evaluate BI and decision support in the form of evaluation of accounting information systems:

• Research in accounting information systems has been active in five areas. Proposing and designing of models and evaluation of IT application are discussed as innovative research area in AIS. Therefore the need to strengthen this sector to enhance research in AIS with an emphasis on new concepts is felt.

• The value of information systems such as accounting and technology per se, is determined based on the scientific use of those systems in decision making (Doraj&Kohli, 2003).

• In the field of evaluation and especially selection of MAIS's, in recent years good research has been carried out in terms of quality and quantity, However, the literature on evaluating MAIS's lacks a focus on BI and decision support.

Procedure and Methodology

Research method is not often optional. The nature of the topic imposes its type. Research on combined human, social and organizational topics where numerous factors in different spheres of influence are involved, cannot be included within the scope of quantitative methods and analytic perspectives so as to achieve comprehensive concepts. Selecting a suitable approach is first and main step in the research process.After determining the research background and topic, the process is shaped by the research strategy. In this study, based on the research objectives, using a meta-analysis, some of the applied criteria and parameters of accounting information systems were examined based on BI features.

Therefore, in order to determine the evaluation needs of BI in MAIS's, the literature related to decision support and BI was used to extract the evaluation criteria based on a library study and evaluation of MAIS'sbased on BI with the same basis. First, the theoretical basis of perspectives of the modern accounting system will be discussed as follows:

Theoretical principles and approaches in the literature of AIS: Based on modern literature of AIS and the existing relationships, five perspectives could be explored:

1. Processes of adoption of new technology in AIS
2. Designing and modeling of AIS
3. Cognitive sciences
4. Business and IT application evaluation
5. Control and audit

The paradigm of adoption of new technology ,is concerned with innovation in this technology from the viewpoint of AIS and its acceptance by potential users (Begard et al., 2003; Lee &Pingster, 2005, Rose &Kramerguard, 2006; Jelynas&Gugan, 2006). The paradigm designing models in AISwas reinforced a few decades ago, when McCarthy developed the model of source, event and executive factor (McCarthy, 1979, 1982, 2003; Don & McCarthy, 1997). Now this type of AIS research is generally conducted through designing models in the field of information hation and with the aim of producing the databases to provide real world information (Grits & McCarthy 2002;

Bourticeck& Jones 2007). The paradigm of cognitive sciences use human thinking computational as well as information models to search in AIS (O'Leary, 2003; Ray et al., 2003; Bowen, et al. 2003, Wheeler et al., 2004, Dila& Steinberg, 2005, Wheeler & Jones, 2006; Peng et al. 2007). The paradigm of IT valuation rather more rooted in accounting than IT, discussing the effects of IT business performance (Denhing et al., 2006; Al-Bashir et al., 2008; Kobelsky et al. 2008; Bradley, 2008, Brazel& Deng, 2008;Baja et al., 2008; Wang &Alaum, 2007; Bernie &Metrlie, 2007). The paradigm of control and audit is focused on the system improving the quality of accounting information by AIS.

Here, either the focus is on controlling inputs and outputs of AIS (managerial controls) or on AIS (IT control). Literature in relation to this paradigm rebeals concepts such as continuous auditing, Internet (Web) sales, information security and procedures to query information (e.g.O'donnell, 2005; Ales et al. 2008;Bourticeck& Curtis, 2008;Valtras, 2007; Abu Musa, 2006, Videnmeyer & Ramamoorthy, 2006).

Accounting information system with a new approach

AIS is a component or element of the company that provides users with relevant information on decision making through processing financial events. AIS can be considered a logical intersection of two broader issues, i.e. accounting and Management Information System (MIS). What is common in both fields of accounting and MIS is the pivotal attention to information. Accounting is more orientated to information per se, whereas MIS attends to covering systems that produce information.

Accounting information system component and element of the company by processing financial events, financial information and information based on the decision puts at the disposal of users. The system accounting information can be logical confluence of two broader issue of accounting and information systems Management knew. What is common to both disciplines of accounting and management information system is considered pivotal to information. Accounting information to trend, while orientation (MIS) covering most of the systems that produce information. A view of these three environments is provided in the following figure.
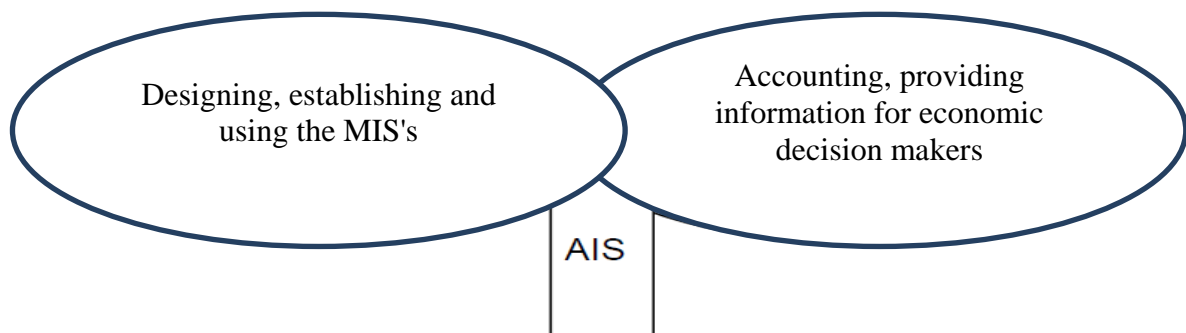

Figure 1: The role of AIS

Recently, managers have called for the use of computer tools capable of predicting or structuring primary data. Today, the use of "automated decision making" which is done with the help of intelligent expert systems, it could be simplified. Accounting is exposed to additional information load such as internal audit and controls involving high volumes and complexity of information. Thus, when information is high, it needs to be reviewed and controlled. In management accounting, when information is considered in a timely manner, the need to have a system with such a reaction is inevitable while preparation of such information will be much more complicated in some sections. Therefore, the use of intelligent systems in need of accounting information that

support management decision will be required. Accordingly, in many different sections, a chain of different reactions on the part of companies has evolved which is as follows:

Firstly, companies that have implemented intelligent system successfully should know that their competitors are also looking for such a situation. The most famous accounting companies have embraced this new technology in an attempt to win and achieve a better position in the market. Thesecompaniesare not satisfied merely by setting up an intelligent package but also smart want intelligent accounting systems with the aim of providing better results. BI systems are information systems, which can be also sold to other companies. However, for the following reasons there is a few of such an opportunity in the accounting environment (Nordlander, 2001):

1. Experts who pay the price of using the system in preparation step do not tend to share knowledge and experience with others and prefer to be unique players in the market.

2. Providing an intelligent information system is a costly and time-consuming process; therefore, only large companies have access to such resources. However, these companies do not want to sell their products, as they rarely tend to provide others with their own resources. Thus, they bear the preparations costs for maintaining competitive advantage alone.

3. Using intelligent AIS requires compliance with some rules, inattention to which can cause customer dissatisfaction. From this point of view, they are unlike software programs that can deal with the error before the results of expert reports.

4. Knowing the owner of the stored expert decision information (information producer or expert users) is of high importance, because the sale of an intelligent information system, regardless of its intellectual property rights would cause problems.
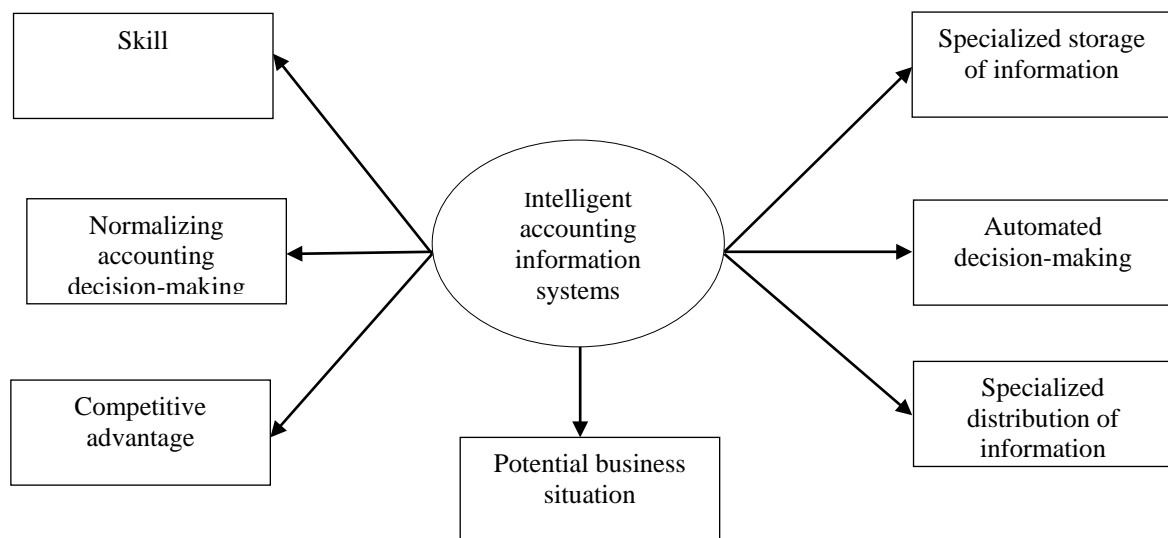

Figure 2: The benefits of Intelligent accounting information systems (Florin, 2007)

Intelligent accounting information systems have not developed enough and interested companies can benefit from advantages of other companies' experience by purchasing expert systems. The use of intelligent information systems in accounting based on competitive advantage is a new attitude in the profession of accounting. Few systems are directed under the normalization of accounting decision-making system with logical arguments, structural analysis and practical processes. Obviously, some situations suggest surprising images in that accountants can process and decide in lieu of managers, however, such ability is merely an illusion, but this kind of attitude can be appropriate for the accounting science. Most of the time, accountants face complex, undefined and non-structured problems that could not be solved with traditional optimization methods. In this

situation, the only solution can be achieved by using artificial intelligence and techniques. Therefore, without denying the importance of intelligent information systems it should be noted that this importance in accounting is created due to its multiple advantages and application of new technology in this area. However, it seems that companies and researchers interested in intelligent accounting systems grow at a slow pace. Scientific journals with this theme have not been evolved yet.

Decision support and business intelligence

Today's rapidly changing business environment has led to the need for timely and efficient business information more than ever, and the intelligence is not only necessary for the success of an organization but it is vital for its survival. In this section, the concepts and issues related to business intelligence are briefly discussed. Business intelligence refers to a philosophy and management tool that helps organizations manage and refine business information for effective decision-making (Ghoshal, et al., 1986). The term Business Intelligence can be used in reference to this case (Lonnquist, et al., 2006). Information and knowledge of the organization describing the business environment, the organization itself, the market situation, customers, competitors, and economic considerations involves a systematic organized process by which organizations analyze and distribute information from internal and external sources for decision-making in business activities.

A study in 2006 by Gartner indicated BI as the hottest issue in IT because these systems are so focused on projects that enable users to influence the financial-business performance well (Gartner, 2007). Herschel and Jones defined BI as a tool for making better decisions. They pointed to Gartner's advice describing BI as a set of technologies that collect and analyze data to improve decision-making. In addition, they added that the concept of BI is "to identify and categorize the latent concepts associated with decision-making and a host of business and economic data (Herschel et al., 2005).
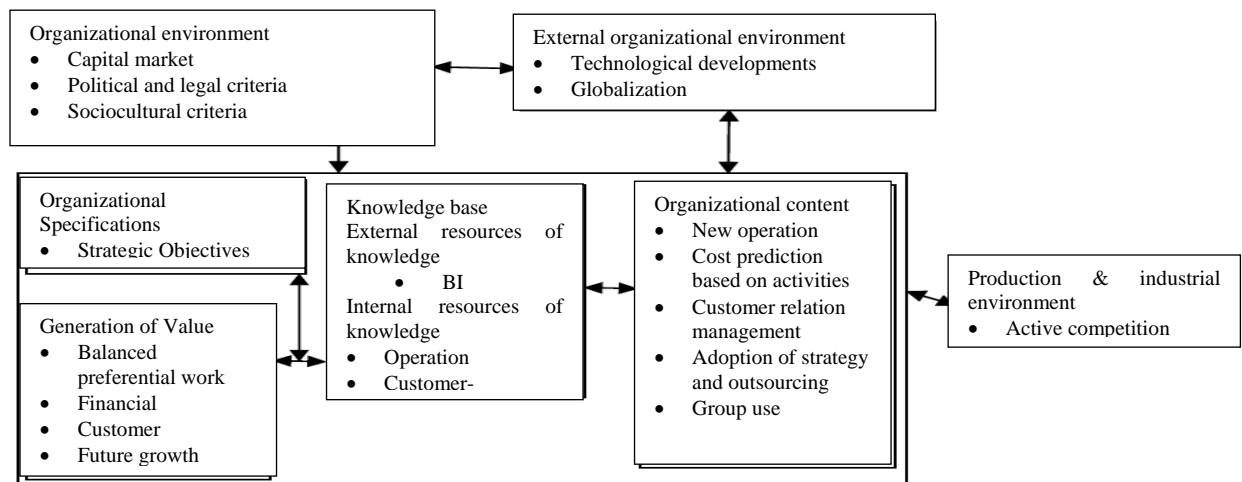

Figure 3: BI evaluation model

The purpose of BI is to help control the flow and resources of business information within and around the organization. In the age of information, BI helps organizations by identifying and processing massive different data to intelligent pure knowledge needed by managers.BI provides business information timely and appropriately, for users enabling them to find and infer latent concepts related to business information (Azoff et al., 2004). The major application of BI, is assistance in organizational decision-making, therefore, using organizational systems' structural and non-structural data is considered as the basis for BI (Baars& Kemper, 2008).

In BI literature, it is noted that greater advantages could be obtained using BI (Thomas, 2001), while few organizations use the measurement criteria and indices of BI (Baars& Kemper, 2008. This is worth noting that BI is also known as competitive intelligence, since many organizations apply BI to achieve competitive advantage. Below, the BI evaluation model is provided for beneficiaries.

Discussion and conclusion

According to the research conducted in this area, which lacks studies on evaluation of MAIS's focusing on decision support as well as the new concept of BI, the innovation of the present study is a combination of proposing MAIS's and its application in IT management based on BI. In fact, given the relationship of BI and decision support with organizations' competitive advantage as an ongoing organizational activity, the innovation of the present issue is the generation of a strategy-based MAIS in order to determine its effect on decision-making. Therefore, proposing a framework consisting of BI criteria in MAIS's could also be considered as another aspect of innovation. A review of the previous research indicates the following points in evaluating BI in the form of MAIS's:

1. According to the review of the related literature and a library study, the use of MAIS's based on BI and four categories of relationships and inferences, warning and reporting systems, and tools for effective analysis and decision-making are proposed to provide an intelligent systems as follows: Figure 4: Conceptual model of BI-based MAIS
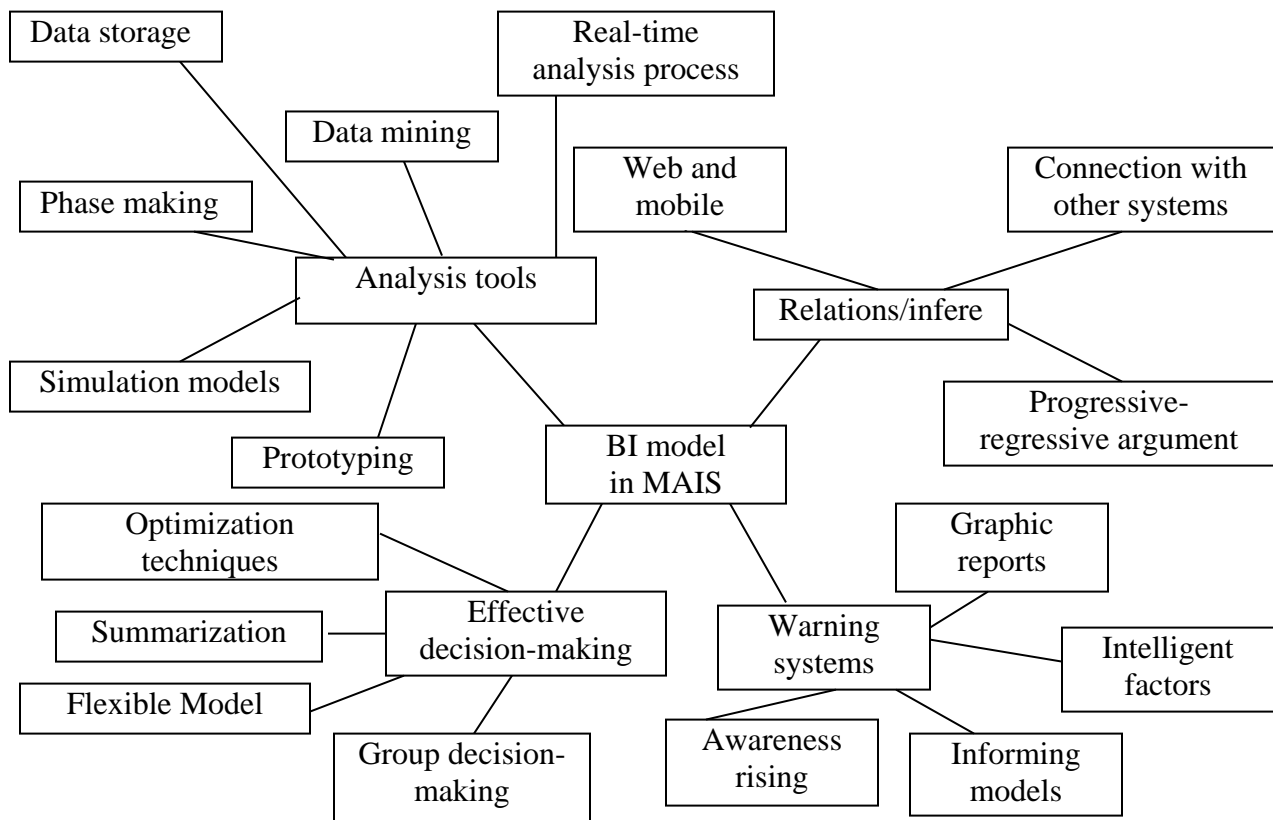

Figure 4: Conceptual model of BI-based MAIS

2. Research in accounting information systems has been active in five areas. Proposing and designing of models and evaluation of IT application are discussed as innovative research area in AIS. Therefore, the need to strengthen this sector to enhance research in AIS with an emphasis on new concepts is proposed.

3. In recent years regarding the evaluation and especially selection of MAIS's, good qualitative or quantitative research has been carried out in terms of, however, the literature on evaluating MAIS's lacks a focus on BI and decision support. In recent research on evaluation of MAIS's, given the importance of the issue for organizations, developing specialized evaluations, and specific evaluations models for functional or non-functional needs have been proposed.

References

Anderson, J. L., Jolly, L. D. and Fairhurst, A.E. (2007).Customer relationship management in retailing: A content analysis of retail trade journals, Journal of Retailing.

Arabmazar, M. Fathollahi, M. Kamrani, J. (2007). The reasons for success and failure in the implementation of information systems, Accountant, Chartered Accountants Association of Iran, No. 184: 39 – 45.

Dastgir, M. Jadidi, A. (2004). The effect of the characteristics of accounting information system to improve management decision making wedge February, Accounting surveys, (34), 27-50.

Azadivar, F., Truong, T. and Jiao, Y. (2009). A decision support system for fisheries management using operations research and systems science approach, Expert Systems with Applications 36: 2971–2978.

Azoff, M., Charlesworth, I. (2004), The New Business Intelligence. A European Perspective, Butler Group, White Paper.

Baars, Henning and Kemper, Hans-George (2008), Management Support with Structured and Unstructured Data—An Integrated Business Intelligence Framework Information Systems Management, 25:2, 132 —148.

Berzal, F., Cubero, J. and Jiménez, A. (2008), The design and use of the TMiner component-based data mining framework, Expert Systems with Applications.

Cheng, H., Lu, Y. and Sheu, C. (2009). An ontology-based business intelligence application in a financial knowledge management system, Expert Systems with Applications 36: 3614–3622.

Damart, S., Dias, L. and Mousseau, V. (2007). Supporting groups in sorting decisions: Methodology and use of a multi-criteria aggregation/disaggregation DSS, Decision Support Systems 43: 1464–1475.

Davenport, T., (2004), Decision Evolution, CIO Magazine, Oct. 1;

Editorial, (2009)An electronical approach in accounting information systems, international journal of accounting information systems 10,p 173-176.

Etemadi, H. DianatiDailami,Z. (2008). The impact of organizational culture, participation in budgeting, management accounting systems and performance management. 13: 34-60.

Florin Aparaschivei,(2007),Considerations on Accounting Intelligent Systems Importance, Facultatea de Economieşi Administrarea A facerilor ,Universitatea "Al. I.Cuza" Iaşi, Informatica Economică, nr. 2 (42).

Fordham, D R, Riordan, Diane A, Riordan P, (2002). Business intelligence: How accountants bring value to the marketing function, Strategic Finance , Wednesday, May 1 .

Gao, S. and Xu, D. (2009). Conceptual modeling and development of an intelligent agent-assisted decision support system for anti-money laundering, Expert Systems with Applications 36: 1493–1504.

Ghoshal, S., Kim, S. K. (1986), Building Effective Intelligence Systems for Competitive Advantage, Sloan Management Review, 28(1), 49–58.

Gottschalk, P. (2006). Expert systems at stage IV of the knowledge management technology stage model: The case of police investigations, Expert Systems with Applications 31: 617–628.

Heidari, m. (2013). The effect of business intelligence on the structure of the virtual network, 21: 1 – 20.

Khajavi, S. Etemadi, M. (2011). The factors affecting the successful implementation of information systems accounting firms listed in the Tehran Stock Exchange.2: 1 – 22.

Li, S., Shue, L. and Lee, S. (2008).Business intelligence approach to supporting strategy-making of ISP service management, Expert Systems with Applications 35: 739– 754.

Lönnqvist, Antti and Pirttimäki, Virpi (2006) The Measurement of Business Intelligence, Information Systems Management, 23:1, 32 — 40.

Mac Loyd, R. (2000) Management information systems, translator Mehdi Jamshidian and Mehdi Pour grant Akbar Abadi, Isfahan University.

Mahmoudi, H, Nikoumaram H, S. (2013). The approach of the management accounting information system based decision support using TOPSIS algorithm. Journal of knowledge of accounting and management accounting 13: 47-65.

Marin, J., Poulter, A. (2004), Dissemination of Competitive Intelligence, Journal of Information Science, 30(2), 165– 180.

Mostajeran, A. (1380), management information systems, MrsQiu Publications, Tehran.

Nguyen, T.M., Tjoa, A.M., Nemec, J. and Windisch, M. (2007). An approach towards an event-fed solution for slowly changing dimensions in data warehouses with a detailed case study, Data & Knowledge Engineering 63: 26–43.

Nie, G., Zhang, L., Liu, Y., Zheng, X. and Shi, Y. (2008). Decision analysis of datamining project based on Bayesian risk, Expert Systems with Applications.

Nordlander, T. E., (2001) AI Surveying: Artificial Intelligence in Busi-ness, MSc dissertation, De Montfort University.

Nykomram, H. Mahmoodi, M. (2013), Impact of accounting information management and business intelligence-based decision support management decision making units Aqtsady.fslnamh Journal of Management Accounting, No. XIII.

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: 413–435.

Oskou, V. Soltani, M. (2012), A model to promote business intelligence and knowledge management approach, National Conference of entrepreneurship and business management knowledge-based, Tehran.

Plessis, T. and Toit, A.S.A. (2006). Knowledge management and legal practice, International Journal of Information Management 26: 360–371.

Pour Amin Zadeh, S. (2010) Organizational intelligence and organizational learning as a powerful tool in the management and organization of knowledge-based companies, The First National Conference on Business Intelligence / business.

Quinn, N.W.T. (2009). Environmental decision support system development for seasonal wetland salt management in a river basin subjected to water quality regulation, agricultural water management 96, 247 – 254.

Rahnama, F. Azadi, S. (2014), Business intelligence, financial, organizational intelligence and business intelligence are displayed at special issue first, Journal of Business Administration Faculty of Management, Islamic Azad University of Tehran, 32: 111- 122..

Reich, Y. and Kapeliuk, A.,(2005), A framework for organizing the space of decision problems with application to solving subjective, context-dependent problems, Decision Support Systems 41: 1 – 19.

Shang, J., Tadikamalla, P., Kirsch, L. and Brown, L. (2008). A decision support system for managing inventory at GlaxoSmithKline, Decision Support Systems.

Shi, Z., Huang, Y., He, Q., Xu. L., Liu, S., Qin, L., Jia, Z., Li, J., Huang, H. and Zhao, L. (2007).MSMiner—a developing platform for OLAP, Decision Support Systems 42: 2016–2028.

Tan, X., Yen, D. and Fang, X. (2003). Web warehousing: Web technology meets data warehousing, Technology in Society 25: 131–148.

Thomas Jr., J. H. (2001), Business Intelligence Why? eAI Journal, July, pp. 47–49.

Tseng, F.S.C. and Chou, A.Y.H. (2006). The concept of document warehousing for multi-dimensional modeling of textual-based business intelligence, Decision Support Systems 42: 727– 744.

Wadhwa, S., Madaan, J. and Chan, F.T.S. (2009). Flexible decision modeling of reverse logistics system: A value adding MCDM approach for alternative selection, Robotics and Computer-Integrated Manufacturing 25: 460–469.

Zhan, J., Loh, H.T. and Liu, Y. (2009). Gather customer concerns from online product reviews A text summarization approach, Expert Systems with Applications 36: 2107– 2115.

Zhang, X., Fu, Z., Cai, W., Tian, D. and Zhang, J. (2009). Applying evolutionary prototyping model in developing FIDSS: An intelligent decision support system for fish disease/health management, Expert Systems with Applications 36: 3901–3913.