International Journal of
Science and Engineering Investigations vol. 1, issue 2, March 2012

# Exploring the Underlying Relations between the Business Intelligence and Knowledge Management

Mojgan Zarghamifard[1], Mohammad Reza Behboudi [2]
[1,2] Management Department of Hormozgan University, Iran
([1] zarghamifard@gmail.com, [2] Behboudi@hormozgan.ac.ir)

***Abstract:*** Business Intelligence (BI) and Knowledge Management (KM) are close concepts to each other and both are relatively new and young area of study in Business. Reviewing the literature indicates that the clear and proper relations between these concepts, BI and KM, has not been yet established. Different researchers have considered different links between them which shows there is no consensus among the researchers. This paper first defines BI and KM, then explores their relationship by reviewing and analyzing the relevant literature and shed more light in this respect. It is found that KM and BI both have similar or common objectives and improve the decision making ability and competitive advantages for the firm. However, KM includes both tacit and explicit knowledge and has considered unstructured data and social models, while BI more focuses on explicit knowledge and is technology-oriented. The paper concludes BI and KM should be integrated, while their differences and abilities should be taken into account.

***Keywords:*** *Business Intelligence, Knowledge Management, Similarities and Differences of BI and KM, Integration of BI and KM*

## I. INTRODUCTION

Due to the challenges and opportunities in business environment, such as intense global competitions, more customized demand of customers, and increases in expenses, effective and efficient management of organizational intellectual capital, namely knowledge, is very important. Business Intelligence (BI) and Knowledge Management (KM) both are involved in production and management of knowledge capital. Therefore research on the relationship between these important business initiations is a worthwhile and essential study.

BI and KM are close concept to each other and both of them are relatively new and young area of study in business. Reviewing the literature indicates that it is not clear the relationship between these two. Different researchers have considered different links between them which indicate there is no consensus among the researchers. Even in practice many confuse KM with BI. According to a survey, by a consulting company, "60% of consultants did not understand the difference between the two" (Herschel, 2008).

In spite of importance of BI, it has not received adequate attention in the literature and probably in practice. One of the way to address this issue is investigating BI in relation with other relevant topic in business and management initiations namely KM. So, this paper intends to explore their relationship by reviewing and analyzing the relevant literature and shed more light in this respect.

To respond to the challenges of the modern enterprise and competitive environment of Businesses, integrating of BI and KM is necessary. Moreover, advances in IT and the trend of application of IT in business facilitate this integration (Albescu and others, 2008). This paper explores the integration of the BI and KM as well.

To integrate these two, we should know what they are, and what their similarities and differences are, which is addressed in this paper based on the literature review. This paper first briefly defines the BI and KM according to the current literature. Then, it presents those studies which discussed about the relationship between KM and BI.

## II. DEFINITION OF BI AND KM

### *A. Knowledge Management*

KM is young area of study and rooted in multiple disciplines and consequently with many definitions without consumes between scholars (Behboudi, 2009). KM is process of leveraging knowledge in organizations in order to keep organization competitive. it involves at least four main processes of knowledge creation, knowledge storage/retrieval, knowledge transfer, and knowledge application or usage (Alavi and Leidner, 2001). Jashapara (2004) by integrating different dimensions of KM with considering the multidisciplinary perspective define KM as: "The effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environment to enhance

an organization's intellectual capital and performance." Diakoulakis et al (2004) believe that KM concentrate on "integration and coordination of individuals' knowledge" and intend to manage an apply current knowledge of organization and create new knowledge.

Bhatt (2001) categorized the KM process into knowledge creation, knowledge validation, knowledge presentation, knowledge distribution, and knowledge application activities. He has shown that KM is not a simple question of capturing, storing, and transferring information; rather it requires interpretation and organization of information from multiple perspectives. Only by changing organizational culture, an organization can gradually change the pattern of interaction between people, technologies, and techniques, because the core-competencies of an organization are established deep into organizational practice. When environment is dynamic, and complex, it often becomes essential for organizations that they continually create, validate, and apply new knowledge into their products, processes, and services for value-addition (Bhatt, 2001).

*B. Business Intelligence*

Although the concept of BI is new, there are some definitions about BI in the literature. These definitions indicate that there is no consensus about the concept of BI; even the BI's definitions are somehow vague. In this section we examine some of them; more clarifications are presented in the next section which compares the KM with BI.

Vandergriff (2009) define intelligence as "the understanding of the past, the awareness of the present, and the prediction of the future for a complex venture". Marren (2004) has considered BI as the rational application of the principles of intelligence services to business and defines it "simply the collection, analysis, and application of strategic information to business decisions".

Vinekar and others (2009) have adopted a definition of BI from Negash (2004), who defines BI systems as those that "combine data gathering, data storage, and KM with analytical tools to present complex internal and competitive information to planners and decision makers." Colin White (2005) defines BI as applications which "analyze business operations and produce information to help business users understand, improve and optimize business operations."

Herschel (2008) defines intelligence in BI "as the discovery and explanation of hidden, inherent, and decision-relevant contexts in large amounts of business and economic data" He by reference to Gartner considers BI "as a set of all technologies that gather and analyze data to improve decision making" which its main theme is optimum utilization of massive data to gain competitive advantages for the organization. These technologies include business rule modeling, data profiling, data warehousing and online analytical processing, and data mining (Loshin, 2003 in Herschel 2008) .Moreover, other researchers by developing a BI framework which encompasses technology side of BI, emphasize the technology-oriented side of BI (Herschel 2008).

TABLE I.
RELATIONS AMONG BI AND KM IN THE LITERATURE

| | **Researchers** | **Relations between BI and KM** |
|---|---|---|
| 1 | Blank, 2010 | BI has many parallels to KM for making better decision. |
| 2 | Cheng and others, 2009 | The integration of decision support and KM processes is crucial to create their BI. |
| 3 | *Vinekar* and others, 2009 | There is interaction between BI and *KM* to create business value through decision-making…… |
| 4 | *Vesset* and *McDonough*, 2009 | KM practices make BI more pervasive throughout the organization. |
| 5 | Knowledge Master Corporation Privacy Policy, 2009 | KM and BI a distinct but interrelated terms of common foundation, mutual effects, complementarities, and synergy. |
| 6 | *Zhang* et. al, 2009 | Data mining (BI technology), concentrates on how to explore algorithms to extract unknown and important pattern, while, KM, use existing knowledge to support business decisions and ignores the technical process of finding knowledge from databases. |
| 7 | Herschel, 2008 | Business intelligence should be viewed as an integral part of KM. |
| 8 | Wang and Wang, 2008 | Knowledge sharing system for Data Mining in the dynamic transformation of explicit and tacit knowledge is useful for BI. |
| 9 | Albescu and others, 2008 | Integrating BI and KM provides real technological support for Strategic Management. |
| 10 | O'Brien and Markas, 2008 | KMS as one of the business intelligence applications which are personalized and web-enabled technologies |
| 11 | Stavrianos and Henderson, 2006 | KM tools can provide a repository for organizing these reports among other relevant information and for collaborative business intelligence (CBI). |
| 13 | Herschel and Junes, 2005 | BI focuses on explicit knowledge, but KM encompasses both tacit and explicit knowledge. |
| 14 | White, 2005 | KM can help business users improve business processes. BI plays a central role in knowledge management. |
| 15 | Haimila, 2001 | KM as the helping hand of BI. |
| 16 | Cook and Cook , 2000 | The concepts of KM and BI are both rooted in pre-software business management theories and practices. |
| 17 | *McCarthy, 1999* | Both activities, BI and KM, have a common objective - the persistence and prosperity of the organization. |

## III. LINKS BETWEEN BI, AND KM

This section investigates the relations between BI and KM in the literature. Table 1 shows brief relations among BI and KM in the literature. Basically, BI and KM have the same or common objectives. Like many business initiations they concentrate on improving business performance, furthermore, they particularly focus on gaining competitive advantages. The purpose of KM is to maximize understanding of business operating environment toward organizational objectives which is similar to BI (McCarthy, 1999). According to McCarthy (1999) if we agree that BI "is comprised of Customer, Competitor and Market Intelligence and that the purpose of conducting BI is to support strategic decision-making, grow the business and monitor the organization's competitors, then we recognize that there are definite similarities between KM and BI". However, McCarthy (1999) indicates two fundamental differences between these two:

- The value of BI and its product, opportunity analysis, is found in its usefulness as a decision making tool;
- The value of KM lies in the ability of the organization to identify, capture and reuse knowledge and in particular best practices in such a manner that it saves the organization time, effort and resources -translated and measured in cost.

Through reviewing the literature, also Wang and Wang (2008) found similarities and difference between KM and BI. They summarized KM as "a set of practices of the creation, development, and application of knowledge to enhance performance of the organization; similar to BI, KM improves the use of information and knowledge available to the organization". On the other hand, they differentiate KM from BI in terms of type of knowledge or information they deal with. KM is concerned with human subjective knowledge, not data or objective information. Therefore many models that applied in the KM are usually non-technology oriented and consider both tacit and explicit knowledge for a dynamic human process of justifying personal belief toward the truth. Additionally, KM proficiently handle unstructured information and tacit knowledge which BI unable to address (Wang and Wang, 2008).

However, information technology also play important role in KM. In terms of technology perspective, Blank (2010) stated that KM represents many documents, information, conversations, blogs, wikis, emails, social networks, knowhow, and expertise which all overload people in organizations and consequently creates challenges for individuals and organizations in filtering out the important knowledge or information from noise. Besides, KM concern with creating, collecting, managing, using and reusing, sharing, and leveraging the unstructured information combined with the structured data. On the other hand, BI discovers "ways to collect, organize, structure, and mine data to help businesses make better decisions". Therefore BI has many parallels to KM, they all about being able to filter out the noise, identify all the variables in the equation, and make the right decisions (Blank, 2010).

"Intelligence approach" to business partly has caused the emergence of KM. Marren (2004) believes that, due to the competitive nature of business, the "intelligence", including all its communications, is far more descriptive term for the discipline than "knowledge."; because "knowledge" is static; "intelligence" is dynamic.

Some definitions of BI consider it more technology oriented and focus on explicit knowledge. For example Herschel (2008) defines BI as a tool to understand hidden, inherent, and decision-relevant contexts with uses set of all technologies, such as business rule modeling and data profiling that gather and analyze data to improve decision making to gain competitive advantages. Moreover, some authors emphasize on the technology-oriented side of BI (Herschel, 2008).

McCarthy (1999) argues that BI leads to production of knowledge and maintains that "the end product of Business Intelligence is Opportunity Analysis and that Opportunity Analysis, once classified, becomes an organization's Intellectual Capital", namely knowledge. He cites that both have common goal which is competitive advantage, and even can consider them as the same activities. However, he refers to some researchers who believe there is difference between these two regarding the knowledge sharing concept.

O'Brien and Markas (2008) have considered business intelligence applications personalized and web-enabled technologies which include KM technologies as well as information analysis and decision support systems. However, not everyone agree with this type of relationship between KM and BI.

Literature review indicates that some authors see KM as an element of BI. Herschel (2008) investigated and maintained that according to some researchers "KM is internal-facing BI, sharing the intelligence amongst employees about how to effectively perform the variety of functions required making the organization go. Hence, knowledge is managed using many BI techniques. Others contend that a "true" enterprise-wide KM solution cannot exist without a BI-based metadata repository. They believe that a metadata repository is the backbone of a KM solution. That is, the BI metadata repository implements a technical solution that gathers, retains, analyzes and disseminates corporate "knowledge" to generate a competitive advantage in the market. This intellectual capital (data, information and knowledge) is seen as both technical and business-related" (Herschel 2008).

Some studies showed the link between BI and KM by suggesting the integration of these two, because both have similar objectives such as organizational learning and effective decision making. Herschel (2008) found different ways or frameworks of integration of BI and KM, in which there is no agreement whether which one is a subset of the other. These frameworks includes Malhotra' s models at the conceptual level, which proposed general models of integration of KM

and BI for routine structured information processing and non-routine unstructured sense making. Another model is White's flowchart model that articulates the use of BI in the KM context for decision making (Herschel, 2008). Herschel (2008), in addition, reflected the criticism of researchers regarding the relationship between BI – KM, and technology. They argued that the roles of technology in KM and BI should be considered, rather than regarding BI and KM as technology.

Some studies see the BI as integral part of KM which leads to better and successful KM. For example, Herschel (2008) argued that BI activities should lead to knowledge improvement. in other words, "the effectiveness of BI should measure based on how well it promotes and enhances knowledge, how well it improves the mental model(s) and understanding of the decision maker(s), and how well it improves decision making and, hence, firm performance. Business intelligence should therefore be viewed as an integral part of KM".

Too many operating data required various corporate databases which using them is one of the great challenges in especially knowledge-intensive organizations; one solution is consolidating them to access and generate valuable knowledge and share information among organizational users within the company or among the business partners. Thus, a system of integrating KM and decision support processes is necessary (Cheng and others, 2009). In turn, this facilitates the application of BI techniques such as data mining to find the hidden patterns in consolidated databases and data warehouses.

Some studies have examined the role of BI in KM. White (2005) considers BI as applications which "analyze business operations and produce information to help business users understand, improve and optimize business operations". This information may be produced by processing the data stored in a data warehouse.

White (2005) shows BI plays a central role in KM. However, he argues that "for a traditional BI system to fully support a KM environment, it must provide, or works in conjunction with, capabilities like business process management, business planning software, collaborative software, portals, and content management systems to be able to support more timely data").

Some researchers explore the relationship between one components of BI with KM, for example, Zhang et.al. (2009) while acknowledge lack of enough investigation between KM and data mining, argues that data mining, concentrates on how to explore algorithms to extract unknown and important pattern, while, KM, use existing knowledge (both implicit or explicit) to support business decisions. However, KM ignores the technical process of finding knowledge from databases. Zhang et.al. (2009) introduce intelligent KM which enables production of intelligent knowledge base on the hidden patterns generated by data mining.

To sum up, Figure 1 demonstrates the relationship between BI and KM according the literature review. Both BI and KM activities support better decision making and result in effective solution. It seems that BI leads better KM by being integral part of KM and plays important roles in KM. In addition, it promotes and enhances KM. however; some researchers see the relationship differently. They argue that KM and its processes are helping hand of BI and make it more pervasive in organizations.

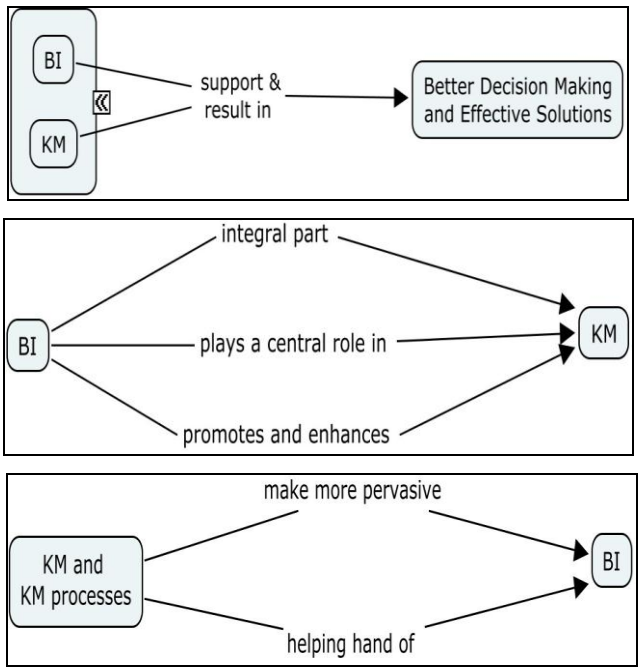


Fig. 3 the different relationship between KM and BI based on the literature review

## IV. CONCLUSION

BI and KM are relatively new area of study and their relations with each other have not been yet clarified. This study has conducted a literature review and analyzed the studies that have been performed in KM and BI area, especially those studies that discussed the relationship of these two. Also this paper shows that there is not yet any consensus about what is the links between these or how should be. However both of them support better decision making and result in effective solutions. Some believe that BI leads better KM by being integral part of KM and plays important roles in KM. Furthermore, BI encourages and enhances KM. While other researchers argue that KM and its processes are helping hand of BI and make it more pervasive in organizations.

Another point that we can conclude from the literature

review is that KM is concerned with human subjective knowledge and includes both explicit and tacit knowledge, while BI concerned with data or objective information and explicit knowledge, as a result is more technology-oriented. In addition, in KM culture and knowledge sharing is important and considered as key variables, while BI more focuses on initiations such as data mining.

Furthermore, it seems that KM more concentrates inside of organization by sharing the intelligence amongst employees; whereas, BI focuses both outside of organization and as well use techniques to process organizational data and information to produce knowledge through information techniques.

We conclude and suggest that BI and KM should be integrated: but their difference and ability should be taken into account. Similar to Herschel (2008), we argue that because knowledge is integral component of business intelligence and decision making, KM and BI, while differing, need to be considered together as necessarily integrated and mutually critical components in the management of intellectual capital. Still there is no comprehensive model indicating the relationship and interrogation of BI and KM, there is not agreement whether which one is a subset of the other, just some studies see the BI as integral part of KM. Therefore, future research should address this issue.

## REFERENCES


[1] Alavi, M., Leidner, D. E., 2001. Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25(1).

[2] Albescu, F. Pugna, I. and Paraschiv, D., 2008. Business Intelligence & Knowledge Management – Technological Support for Strategic Management in the Knowledge Based Economy. *Revista Informatica Economică*, nr. 4(48).

[3] Behboudi, M. R., 2009. Knowledge Intermediaries in Successful Knowledge Reuse and Sharing, PhD Dissertation, *The Australian National University*.

[4] Bhatt, G. D., 2001. Knowledge Management in Organizations: Examining the Interaction between Technologies, Techniques, and People. *Journal of Knowledge Management*, 5(1).

[5] Blank, R., 2010. Is it Knowledge Management or Business Intelligence? Available at :*http://aiimcommunities.org/e20/blog/it-knowledge-management-or-business-intelligence*. Accessed 15/11/2010.

[6] Cheng. H., H, Lu,Y.B, Sheu, C., 2009. An ontology-based business intelligence application in a financial knowledge management system Expert Systems with Applications, *Expert Systems with Applications*. Vol 36, pp .3614–3622.

[7] Cook, C. and Cook, M., 2000. The Convergence of Knowledge Management and Business Intelligence, Auerbach Publications, New York, NY, available at: *www.brint.com/members/online/20080108/intelligence/*.

[8] Dyk,L.V, and Conradie, P, 2007. Creating business intelligence from course management systems, *Campus-Wide Information Systems*, Vol. 24 (2).

[9] Haimila, S., 2001. KM in practice: the helping hand of BI, *KM World*, Vol. 10(10).

[10] Herschel T.,R, E. and Jones, N, 2005. Knowledge management and business intelligence: the importance of integration. *Journal of Knowledge Management*, Vol. 9 (4), pp.45 – 55.

[11] Herschel, R., 2008. Knowledge Management and Business Intelligence, available. *at: http://www.b-eye-network.com/view/7621*. Accessed at 15/11/2010.

[12] Jashapara, A., 2004. Knowledge Management: An Integrated Approach, Harlow, England, Pearson education Limited-Prentice Hall.

[13] Marco, D., 2002. The key to knowledge management, available at: www.adtmag.com/. article.asp?id¼6525, acsessed at 15/11/2010.

[14] Marren, P., 2004. The father of business intelligence, *The Journal of Business Strategy*. Boston, Vol. 25(6); pg. 5-8.

[15] McCarthy, S., 1999. Business Intelligence versus Knowledge Management, *Inside Knowledge*, Volume 2(9).

[16] O'Brien J. and Marakas G., 2008. Introduction to Information Systems, Fourteen edition, McGraw-Hill Higher Education, New York.

[17] Stavrianos, M, Henderson, D., 2006. Collaborative Business Intelligence: Integrating BI and KM. *Information Management Magazine*. issue of DM Review's Extended Edition.

[18] Vandergriff, L. J., 2008. Welcome To The Intelligence Age: An Examination of Intelligence As A Complex Venture Emergent Behavior, *The journal of information and knowledge management systems*, Vol. 38 (4), pp. 432-444.

[19] Vesset, D, and McDonough,B., 2009. Taking lessons from KM to influence business intelligence pervasiveness. *KM World*, Vol. 18 (4), pg. 20-23.

[20] Vinekar, V. V, T.C. Teng, J, Chennamaneni, A., 2009. The Interaction of Business Intelligence and Knowledge Management in Organizational Decision-Making. *Journal of International Technology and Information Management*, Vol. 18(2).

[21] Wang H, Wang, S., 2008. A knowledge management approach to data mining process for business intelligence, *Industrial Management & DataSystems* ,Vol. 108(5), pp. 622-634.

[22] White, c., 2005. The Role of Business Intelligence in Knowledge Management, available at : *http://www.b-eye-network.com/view/720* accessed 15/11/2010.

[23] Zhang, L., Li, J., and Yong Shi, Liu, X., 2009. .Foundations of intelligent knowledge management, *Human Systems Management*, Vol. 28 (4); pg. 145.



Mojgan Zarghamifard is faculty member in the management department of Hormozgan University, Iran; (e-mail: zarghamifard@gmail.com).

Mohammad R. Behboudi was with ANU, Canberra, Australia. He is now with the Department of Management, Hormozgan University, Iran (e-mail: Behboudi@hormozgan.ac.ir).