

## **A Model for Improving the Business Intelligence of the Companies Envisaging Knowledge Management Approach: A Case Study of the Knowledge-Based Organizations of East Azarbaijan Science and Technology Park**

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**Abstract:** Currently, business intelligence is regarded as a competitive advantage and a vital factor in the organization's success. Business intelligence integrates the data and information of the organizations and provides the opportunity of controlling and navigating the key processes of organizations for the managers and it is also regarded as a foundation for making effectual decisions. Establishing business intelligence requires providing some prerequisites as shown by investigations. One of the most conspicuous and significant elements for establishing business intelligence is management of organizational knowledge. In the same vein, the current study has been carried out in order to investigate and present a model for enhancing business intelligence of companies with knowledge management approach in the knowledge-based companies of East Azarbaijan Science and Technology Park. The population of the study are managers and experts of knowledge-based companies of East Azarbaijan Science and Technology park during the year 2010-11. In order to collect the required data, the researchers employed two questionnaires on business intelligence and knowledge management which are designed according to the elements of each of the variables of the investigation. In order to test the research hypotheses, the statistical tests of t-student, ANOVA, Pearson correlation coefficient are utilized. The results of the study indicated that knowledge management and business intelligence were favorable in the investigated criteria. Further, there is a positive significant relationship between business intelligence and knowledge management. Besides, no significant relationship was witnessed between knowledge and companies' experience neither between business intelligence and company's intelligence.

**Key words:** Knowledge management, business intelligence, knowledge based companies, East Azarbaijan Science and Technology, Iran, park

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### **INTRODUCTION**

Now a days, due to intensification of competitions, countries and firms do not merely rely on restricted internal resources of organization or accidentally obtained information from the external environment for making decisions and taking competitive strategies. In fact, having precise, effectual and up-to-date information is considered as one of the power tools at the national and firm level. Hence, organizations make efforts to obtain the best information resources about their business environment and to employ them in their strategic planning effectually (Rothberg and Erickson, 2005).

It is an undeniable fact that knowledge is one of the most significant assets of any organization and it is increasingly being managed to maintain the competitive advantage of the company. The organizations must accept that the philosophy of their existence has changed. It can be asserted that using business intelligence can

increase the competitiveness power of any organization which is a distinctive trait. This solution by employing the existing information, enables the organizations to utilize the competition advantages be pioneer have a better understanding of the demands and needs of customers and facilitate management of the interactions with them, so that the companies can control the negative or positive changes. Considering the new management challenges, the significance of knowledge based capitals has increased which has led to emergence of new management tools and concepts such as business intelligence and knowledge management. These concepts are taken into consideration in order to enhance the performance of organizations (Kadayam, 2002).

Knowledge management and business intelligence is of utmost importance in any organization but it is of higher significance in knowledge based companies whose existence philosophy is producing and publishing knowledge. Despite, the fact that numerous researchers

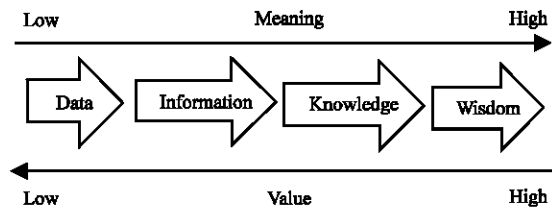


Fig. 1: Processes involved in changing of data to wisdom (Tobin, 1996)

and researchers have emphasized the key role of knowledge management and business intelligence of organizations but only a limited number of scientific investigations have been conducted on the relationship among knowledge management and business intelligence. Therefore, the present study has tried to add to this empirical evidence and investigate the relationship between knowledge management and business intelligence of knowledge based companies of East Azarbaijan Science and Technology Park through empirical test. In the same vein, at first the theoretical foundations of knowledge management and business intelligence have been discussed and then after investigating the knowledge management and business intelligence level of the organizations and presenting a conceptual model, the relationship between knowledge management and business intelligence was investigated.

### Theoretical foundation of the study

**Knowledge and knowledge management:** One of the foundations of issues related to knowledge is understanding the three concepts of data, information, knowledge and the interaction among them. Sometimes another element is added to this triangle that is wisdom. For having a precise definition of knowledge management knowing these elements is significant.

Data is a reality from an opportunity or a case from a particular domain without interaction with other things. In fact, data is raw facts and realities. Information is formed by adding field and interpretation to data and processing them into each other (Squier, 2003). Knowledge is adding understanding and memory to information which leads to natural development of information. In this way, knowledge can be defined as perspectives resulted by data and information that are effectual in different occasions and are separable in different forms. In general, knowledge is an understanding and perception resulted by experience, reasoning, intuition and learning (Davenport and Prusak, 1998). When knowledge is employed for making decisions in real life occasions it is changed to wisdom (Gandhi, 2004).

Figure 1 illustrates the processes of changing data to wisdom and value and meaning comparison of

each level. In every organization two types of knowledge can be identified; explicit knowledge and implicit knowledge. Implicit knowledge is abstract knowledge whose resources and content are laid in mind. Hidden knowledge cannot be easily achieved and it is non-structured. In fact this kind of knowledge is the unwritten knowledge of the organization and explicit knowledge is a knowledge that is objective and can be formally stated in a frame of systematic language. This kind of knowledge is independent from the employees and exist in computer information systems, books, documents and organizational documents and alike (Nonak and Takeuchi, 1995).

Integration of implicit and explicit knowledge in a determined structure is considered as a significant issue in knowledge management of course, this kind of structure is dependent to the purposes of organization and its available resources.

Despite the fact that numerous investigations have been conducted in the field of knowledge management, there is no unanimous agreement on the concept of knowledge management (Earl and Scott, 1999). Different perspectives on knowledge can lead to definitions of knowledge management. In one definition, knowledge management is defined as helping the organization to detect, select, organize, distribute and transfer of knowledge and experience successfully for activities such as problem solving, strategic planning and decision making (Gottschalk, 2007). In another definition, knowledge management is defined as a set of regular and systematic organizational activities for achieving a greater value through knowledge (Merwick, 2001).

In a comprehensive definition of knowledge management it has been introduced as a practicing management and facilitating the knowledge transfer (implicit to explicit and vice versa) within an organization through collecting, sharing and using knowledge as an organizational capital in line with achieving the purposes of the organization.

**Knowledge management process:** Diverse approaches are investigable for different approaches of creating knowledge: the process of transferring and creating implicit knowledge to explicit at different levels (individual, group, organization). The process of practicing knowledge management such as detecting, achieving, developing, sharing and employing and some of the proposed models have investigated the knowledge process in a static way (without creating knowledge cycle) and some of them investigate it in a dynamic cycle with constant interaction among its constituents. In order to assess the dimensions of knowledge management cycle in an organization, different models are presented some of

**Table 1: Stages of knowledge management processes**

Stages of knowledge management process	Researchers
Creation, acquisition, transfer, deployment	Wiig (1997)
Determination of requirements, acquisition, distribution, deployment	Davenport and Prusak (1998)
Mapping, business and creation, packaging, storage, sharing, deployment, reuse	Chauvel and Despres
Setting goals for knowledge, identification, acquisition, development, maintenance, sharing, deployment, assessment	Probst <i>et al.</i> (2000)
Creation, storage, transfer, deployment	Alavi and Leinder (2001)
Acquisition, organizing, storage and presenting, sharing, assessment	Aspinwall and Wong
Creation, encoding, retrieval, deployment, distribution, validating, tracking, personalizing	Jashapara (2004)

which are presented in Table 1. The fundamental notion in all these models is emphasizing the use and deployment of knowledge and all the stages in order to facilitate the deployment of knowledge.

**Assessing knowledge management:** Knowledge management is complicated due to the intangible nature of knowledge (Rowley, 2004) and this issue is of great significance in assessing the results of knowledge management. This issue is very difficult due to the need to prove the value of knowledge management and competence among employees, managers and Shareholders. Most of the investigators have made efforts to actualize an approach that can deploy the financial results for assessing knowledge management; however, the nonfinancial results of knowledge management such as education, creativity, designing new products and are neglected (Arora, 2002). In most of the investigations, knowledge management has four stages including creation, storage and assessment, transfer and deployment of knowledge and the fifth stage which can be measuring knowledge is constantly missing despite the fact that its existence is vital for success of execution of knowledge management (Berryman, 2005).

Carneiro proposed that besides using financial traits, the organizations can use nonfinancial traits as criteria for assessing the results of knowledge management. The methods for assessing knowledge management performance in classifications of research achievements are abundant. As was mentioned, developing the methods due to records, experiences of researchers and domains of issues are different (Alavi and Leidner, 2001). One of the most comprehensive methods of measuring knowledge management in an organization is the Knowledge Management Assessment Technic (KMAT) which is designed and developed by America Productivity and Quality Center (APQC). This method assesses the knowledge management of organizations in 5 dimensions and 24 elements in the current study this technic has been deployed.

**Business intelligence:** Intelligence is an ambiguous concept, in many fields efforts have been made to define this issue. Gardner (1997) regards intelligence as a set of abilities employed in problem solving and creating new products which are valuable in a culture. From when the concept of intelligence from experimental studies and paper and pencil tests transferred to the society level, concepts such as intelligence quotient, emotional intelligence, spiritual intelligence and attracted the attention of researchers. One of the most important types of intelligence which is of great importance for major managers of organizations in the field of business is business intelligence. Business intelligence is a frame including processes, tools and different technologies which are required for changing data to information and the information to knowledge. Using the acquired knowledge, the managers can make better decisions and conduct the business activities more successfully by designing practical plans.

Business intelligence systems improve the business performance of the organizations through appropriate use of information related to competitors, customers, suppliers and internal business operations of organizations. At first, an appropriate structure for business intelligence must be designed in the intended organization by considering the analytic needs within the organization. Likewise, the infrastructure of information technology of the organization must be assessed in terms of support ability of the intended structure (Leibowitz, 1999).

Business intelligence can be defined in different perspectives. Business intelligence from management perspective is correction and implementation of manager's decision making in which a knowledge on the basis of the most exact and the most comprehensive real information of the organization is formed. Implementing the created knowledge is an ability for making decision in different levels of organized, unorganized and semi-organized issues and for enhancing the capabilities of the manager in implementing the strategic decisions. From architectural and organizational perspective, business intelligence is a frame for moving from data to information and from the information to knowledge by creating added value and focusing on decision making processes in different management levels in the organization. From marker perspective this issue is creating competitive superiority by using powerful tools of competitor's analysis, intelligent supervision and interaction with costumers and business partner, intelligent supervision of market and identifying its future modifications and process of enhancing organization's profitability in the competitive market. However, from technology perspective, it's an intelligent system that by providing technical and architectural prerequisites tries to enhance and make

optimized use of resources and software and hardware tools to detect, collect, process, draw conclusions and display data and information required by the organization and it is founded on online analytical processing.

Business intelligence systems are not usually a united program, rather they include various constituents which are precisely related to each other in such a way that it enables the applicants to easily select, analyze the data, collect and display the results. From architectural perspective such a system includes the following cases: operational databases and external data: as a source of data. The process of extraction, transformation and loading: which includes collecting the data from different resources, error's control, transformation to particular form and storage in databanks.

Databanks (in different forms): it displays the central database for the whole organization for storing and accessing the data and is separate from operational systems. Tools for accessing and analyzing the data: it transforms the data to information. Most models of analytic tools include: query tools, reporting tools, online analytical processing tools, data mining and (Hocevar and Jaklic, 2010).

**Factors affecting business intelligence organizations:**

As a precise up-to-date systemic approach such as business intelligence can highly affect the performance and application of an organization, many factors can affect the performance of business intelligence. Some of these factors are as follows.

**Customers:** Business needs selling its services and goods. Business intelligence helps business to know its customers better and observe their superiority and it helps it to adjust itself with the customer's demands. Business intelligence implements the data collected from the customers.

**Competitors:** A successful business should not only satisfy its customers but also it should compete with competitors who are constantly trying to seize the customers. Business intelligence can effectually help the companies to determine the strategies deployed by competitors to seize the customers.

**Human resources:** A business intelligence system will eventually interact with human resource in the organization and the performance of this system is at its highest efficacy only when the interaction is conducted in the best possible way. Appropriate designing of

software in a user-friendly way is regarded as a significant factor in this field but the special capabilities of the users is the required condition of this factor.

**Technical infrastructures:** Regarding technical infrastructures of an organization for establishment and proper performance of business intelligence numerous investigations have been carried out. Due to the significant role of this factor, the organization's best efforts have been carried out to provide the prerequisites of BI in line with improving the technical infrastructures of BI.

**Interacting with suppliers:** The interaction of the suppliers means interaction and relationship between the organization and the suppliers in a way that fortification and enhancement of interaction with suppliers of the organization is considered under the title of improving the interactions with suppliers. The objective of interacting with the suppliers is presenting an appropriate frame for constant assessment, developing their performance and selecting the appropriate suppliers. Enhancing the interaction with suppliers leads to enhancement in the time of delivery, product's quality, services and decrease in prices (Elbashir and Williams, 2007).

**Assessment of business intelligence:** The most important issue is understanding the purpose of business intelligence assessment and the way of undertaking this activity (Sveiby, 1997). According to Simons (2000), assessing performance can be conducted for the following purposes: decision making, controlling, guiding, education, learning and foreign affairs.

According to the research literature, assessing business intelligence is conducted with two main purposes: The first and foremost reason for assessing business intelligence is proving its value for investment. In fact the major managers need to make sure that their decisions are logical and appropriate by considering the business intelligence assessment. As Davison (2001) maintained, managers need assessment and evaluation for having business intelligence in order to justify the performances of their organizations.

Helping the process of developing business intelligence and making sure about the issue that the products of business intelligence supply the needs and the real prerequisites of the organization and users is the second reason of assessing business intelligence. For assessing the amount of business intelligence, two questions must be answered:

- What is the cost of implementation of business intelligence?
- What are the advantages of business intelligence?

Implementation of business intelligence requires operational resources and primary investment. Calculating the cost of business intelligence requires the costs of labor force, informational purchases and other costs relevant to activities of business intelligence (Davison, 2001).

Assessing the advantages of business intelligence is not as simple as calculating the costs. Many of the effects of business intelligence are nonfinancial and even intangible, advantages such as improving quality, information's being up-to-date and Hannula and Pirtimäki. The frame for assessing the balanced performance for identifying the factors required for assessing the performance of business intelligence can be utilized. The indexes of balanced performance is on the account of the following cases.

The indexes of assessment are chosen on the account of perspectives and strategies of the organization. The successful factors are chosen from from different perspectives (customers, beneficiaries and). Emphasis on a limited number of success factors is vital. Assessment systems can be used as a tool for providing interactions and implementation of the strategy. The most common assessment framework of balanced performance is the balanced scorecard approach which has four main indexes (Kaplan and Norton, 1996):

- Financial perspective
- Customer perspective
- Business process perspective
- Learning and growth perspective

Another framework for performance assessment is the framework of performance charter. The shape of the charter indicates the complexity and different aspects of organizational performance (Neely *et al.*, 2002). This charter has five angles, the lower and upper ones focus on the beneficiaries of the organization. There are some questions regarding the satisfaction of the beneficiaries which are as follows:

- Who are our key beneficiaries and what are their needs and expectations?
- What are our expectations from the organization's beneficiaries?

After answering these questions, the next stage is discovering the required strategies for satisfying the needs and actualizing the partnership of the beneficiaries, the next stage is finding out the processes which should be considered in the stage of executing the strategy and finally discovering the required capabilities for executing the processes. In the present study, in order to assess business intelligence a researcher-made questionnaire has been employed. The questionnaire is a five-Likert scale questionnaire whose elements are extracted from the investigation's literature.

**Literature review:** The existing literature on theoretical foundations of business intelligence is almost limited. The underlying reason might be its novelty and multi-dimensional nature. The questioning aspect and its advantages instead of exploratory analysis and scientific and academic examination are taken into consideration. Generally, the performed investigations in this field can be classified as follows.

In an investigation which has been conducted with the purpose of examining the content dimension of organization on the efficacy of business intelligence by considering the balancing role of knowledge management in Northern-Tehran Branch of Saman bank. The collected data are examined using the questionnaire and descriptive statistics and inferential statistics (Kolmogorov-Smirnov test, Spearman correlation coefficient and Friedman test) have been utilized. The results of the study indicated a positive significant relationship between content dimensions of the organization and the efficacy of business intelligence and also it indicated that knowledge management fortifies the relationship between content dimension and efficacy of business intelligence.

Another study has been conducted to investigate the effect of culture, structure and organizational strategy on efficacy of business intelligence while considering the balancing effect of knowledge management in vehicle manufacturing industry of Southern Korea. The instruments for collecting the required data (questionnaires) have been designed by considering the conceptual model which is obtained from literature review and the results of the study. The results of the present study indicated that knowledge management strongly strengthens the relationship between culture and business intelligence efficacy and weakly strengthens the relationship between structure and strategy (Zheng *et al.*, 2010).

In another study, the association among organizational factors (structure, culture and technology)

with strategy of knowledge management in Ministry of Labor and Social Affairs has been investigated. In this investigation, creation and transformation of knowledge are regarded as two key activities of knowledge management whose interaction with mentioned organizational factors are examined. The results of data analysis indicated that there is a significant relationship between these organizational factors and knowledge management. Hence, for successful implementation of knowledge management, the organization should be viewed as a whole and all these factors should be taken into account (APQC, 1999).

An academic and scientific investigation was conducted with the purpose of investigating the probable existence of any relationship between knowledge management system in the learning organizations with organizational intelligence and its elements. Organizational intelligence was considered as a combination of the required and used skills by the organization which will lead to modifications. The results of the study indicated that improving organizational intelligence is bound to appropriate structure and performance of the organization, efficient management and deployment of human resources, affective factors, technology and knowledge management of the employees.

The significance of integration of knowledge management and business intelligence have been investigated in another study. In this research, the dimensions and factors influencing the success of business intelligence and knowledge management are explained and in order for the success and efficacy of organizational objectives, the significance of integration of knowledge management and business intelligence have been emphasized. The findings of the study indicated that business intelligence focuses on explicit knowledge and knowledge management includes both implicit and explicit knowledge and both concepts develop learning, understanding and decision making.

Furthermore, another research investigated the approach of knowledge management in the process of data-mining in order to enhance business intelligence of the organizations. The sharing of knowledge among the employees is confirmed and some conditions have been emphasized such as: confidence, commitment and receiving organizational supports for sharing knowledge. The efficacy of knowledge sharing system model for data-mining in transforming implicit and explicit knowledge for developing the business intelligence of organizations is discovered (Rao, 2005).

Another research has studied the professional ways of interaction with customers and the knowledge management of the employees has been considered as a subclass of business intelligence of the organizations. The results of this research indicated that the knowledge management is the internal form of business intelligence and is the distributor of intelligence among the employees so that they know how to organize the different tasks required by the organization in an efficient way. Meanwhile, knowledge is managed by using many techniques of business intelligence.

In another study knowledge management was investigated. In the study knowledge management was considered as an assistant for business intelligence and recognizes one of the ways of success of the organizations as emphasizing knowledge management. The results of this project revealed that using business intelligence is a method of maximizing the use of collected data and enabling the managers to execute the decisions in a better and quicker way (Haimila, 2001).

In another review study which was conducted under the title of "the ways of success of knowledge management", knowledge management and business intelligence were considered as complements of each other for success and growth of the organizations. The results of this study indicated that knowledge management cannot exist appropriately unless it possess a metadata store on the account of business intelligence. In fact, the storage of metadata is the cornerstone of knowledge management. The banks of metadata provide technical ways for collecting, maintaining, analysis and publication of knowledge is an appropriate way for creating competitive advantages in the market.

## **MATERIALS AND METHODS**

The present study investigates the association between knowledge management and business intelligence of knowledge-based companies. With regard to practical objectives and methods, the current study is regarded as a field research. To collect the required data, in addition to utilizing library resources such as books, magazines and scientific reports and theses, the researchers have made use of questionnaires as a tool for collecting data. SPSS Version 16 has been utilized to analyze the obtained data. The population of the study is all the managers and experts of knowledge-based companies of East Azarbaijan Science and Technology Park who are active in various fields such as production and manufacturing, cultural, information technology, quality management and project management, research and development and consultation and biotechnology. For determining the sample volume, Morgan table was employed and the sampling method is random

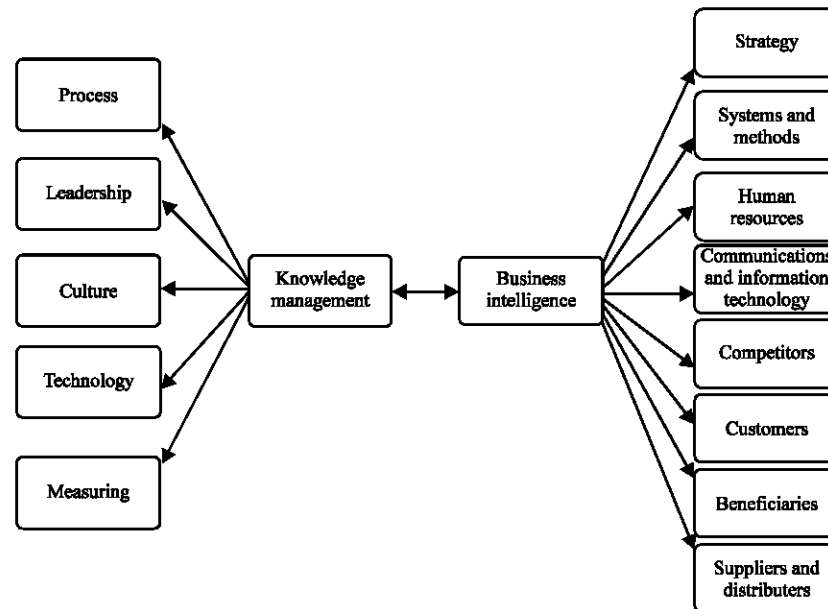


Fig. 2: Research conceptual model

sampling. There are 140 knowledge-based companies among which 103 companies were chosen as the sample. Hence, questionnaires were distributed among the companies with random sampling method, only 89 companies fully answered the questionnaires. The required information for accessing the purposes of the study are collected through two questionnaires of knowledge management and business intelligence consisting of 23 and 48 questions. The questions of the intended questionnaire were designed according to a five point Likert scale (ranging from completely agree to completely disagree) and also on the basis of elements relevant to research variables.

Validity of the questionnaire was confirmed using expert-views obtained from university professors and managers of knowledge-based companies. In order to check the reliability of the questionnaires Cronbach's alpha coefficients was utilized. The Cronbach's alpha coefficient for knowledge management was 0.83 and for business intelligence was 0.91 which indicates the high reliability of the questionnaires. The independent variable of the research was knowledge management and the dependent variable was business intelligence.

**Conceptual model of the research:** Considering the previous investigations and also considering the presented definitions, the conceptual model indicated in Fig. 2 is presented for expressing the impact of mentioned variables.

**Research hypotheses:** On the account of theoretical foundations of the research and by considering the

research conceptual model, the present study is presented in the frame of the following seven research hypotheses:

- Main hypothesis 1: knowledge management in knowledge-based companies of East Azarbaijan Science and Technology Park is in a satisfying condition
- Main hypothesis 2: business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park is in a satisfying condition
- Main hypothesis 3: there is a significant difference among knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields
- Main hypothesis 4: there is a significant difference among business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields
- Main hypothesis 5: there is a significant association between knowledge management and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park
- Main hypothesis 6: there is a significant association between business intelligence and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park
- Main hypothesis 7: there is a significant association between business intelligence and knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park

## RESULTS AND DISCUSSION

In order to test the research hypotheses, parametric tests were utilized. In the same vein, one sample t-test which is known as student-test was used to test the hypotheses 1 and 2. To test hypotheses 3 and 4 ANOVA was utilized and in order to test hypotheses 5-7 correlation test was implemented. The hypotheses and its results are presented in the following studies. In the present study, 5-point Likert scale has been used to analyze the questionnaire's data in such a way that  $3 \geq \mu$  was defined as zero hypothesis and  $3 < \mu$  was defined as hypothesis one. It is worth mentioning that this definition is based on strict perceptive toward the hypotheses and their test has been conducted at a confidence level of 95%:

- Main hypothesis 1: knowledge management in knowledge-based companies of East Azarbaijan Science and Technology Park is in a satisfying condition.
- Main hypothesis 2: business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park is in a satisfying condition

As indicated in Table 2, considering that the critical amount for these tests with confidence level of 95% and degree of freedom 88 is 1.65; the mentioned amount is less than the statistics of the obtained tests. Hence, the zero hypothesis is rejected and hypothesis one is approved. Therefore, at alpha level 5%, main hypotheses of 1 and 2 are accepted. In other words, knowledge management and business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park are in a satisfying level:

- Main hypothesis 3: there is a significant difference among knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields
- Main hypothesis 4: there is a significant difference among business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields

To test these hypotheses ANOVA was used. The results of hypotheses 3 and 4 are presented in Table 3 and 4, respectively. The significant levels in the two hypotheses are 0.120 and 0.335, respectively which implies the acceptance of zero hypothesis. Hence, at alpha level 5%, the main hypotheses of 3 and 4 are rejected that

Table 2: The results of test of hypotheses 1 and 2

Hypothesis	Mean	df	Statistics (t)	Significance level (sig-2tailed)	Test results
Main 1	3.973	88	25.747	0	Hypothesis approved
Main 2	3.898	88	23.883	0	Hypothesis approved

Table 3: The results of test of main hypothesis 3

Variables	Sum of squares	df	Mean of squares	Test statistics (F)	Significance level
Between groups	1.097	5	0.219	1.807	0.120
Within groups	10.080	83	0.121	-	-
Total	11.177	88	-	-	-

Table 4: The results of test of main hypothesis 4

Variables	Sum of squares	df	Mean of squares	Test statistics (F)	Significance level
Between groups	0.454	5	0.091	0.710	0.617
Within groups	10.617	83	0.128	-	-
Total	11.071	88	-	-	-

Table 5: The results of main hypotheses of 5 and 6

Hypothesis	Variable 1	Variable 2	Pearson coefficient	Significance level	Test result
Main 5	Knowledge management	Companies experience	0.038	0.721	Hypothesis rejected
Main 6	Business intelligence	Companies experience	0.110	0.303	Hypothesis rejected

Correlation is significant at level 0.01

is at confidence level 95, it can be claimed that: "there is no significant difference among knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields" and it can also be said that "there is no significant difference among business intelligence of knowledge-based companies of East Azarbaijan Science and Technology Park in different working fields":

- Main hypothesis 5: there is a significant association between knowledge management and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park
- Main hypothesis 6: there is a significant association between business intelligence and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park

To test these hypotheses, correlation coefficient test was used. The results of the tests are revealed in Table 5: as indicated in Table 5, the amount of significance level of main hypotheses of 5 and 6 is  $>0.01$  and the zero hypothesis is approved; hence, at alpha level 10% hypotheses 5 and 6 are rejected that is to say, at confidence level 90, it can be claimed that "there is no



Table 6: Correlation test between knowledge management and business intelligence

Knowledge management	Business intelligence
Pearson correlation	0.782
Significance level	0.000
Number	89.00

Correlation is significant at level 0.01

significant association between knowledge management and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park” and “there is no significant association between business intelligence and the experience of knowledge-based companies of East Azarbaijan Science and Technology Park”:

- Main hypothesis 7: there is a significant association between business intelligence and knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park

Considering Table 6, the significance level of hypothesis 7 is  $<0.01$  and zero hypothesis is rejected; hence, at alpha level 10% the main hypothesis 7 is accepted. In other words, at confidence level 90 it can be claimed that: “there is a significant association between business intelligence and knowledge management of knowledge-based companies of East Azarbaijan Science and Technology Park”.

In the current complicated and dynamic world, the knowledge-based companies are in need of having knowledge management and business intelligence more than ever. With the help of knowledge management and business intelligence, the organizations are able to enhance their capacity and capability in the dynamic world and keep up with its modifications. Implementation and improvement of knowledge management and business intelligence in these companies is not possible without cooperation and coordination of all the employees. Knowledge management and business intelligence will be combined and integrated with each other so that a wider perspective is provided for decision making issues and alternative solutions. If this issue is fulfilled, the intervening variables including implicit knowledge, leadership, culture, structure, regulations and responsibilities and infrastructures of information technology and assessment must be identified and their effect on decision making process must be evaluated.

The results of the current investigation indicate that the circumstance of knowledge management and business intelligence is satisfying in the investigated criteria. Likewise, there is a significant association between

knowledge management and business intelligence. Besides, there is no significant difference between knowledge management and business intelligence in different working fields. Meanwhile, there are significant associations between knowledge management and companies’ experience and between business intelligence and companies’ experience.

Despite the fact that the condition of knowledge management and business intelligence is above the average level, considering the key and critical role of knowledge management and business intelligence in such companies the following improving approaches are proposed:

- The senior management’s supporting of the projects of knowledge management and business intelligence
- Revision and modification of structures and processes of production, acquisition, sharing and transformation of knowledge
- Involving the members of organization in proposing new ideas for improving the working processes
- Improving the technological infrastructures for implementation of knowledge management and business intelligence
- Fostering the principles and criteria of knowledge management and business intelligence through holding educational classes
- Specifying resources and investment in line with enhancing organizational knowledge
- Creating a coordinator center for receiving, purification, classification and analyzing the information
- Reinforcing organizational cooperation through empowerment, team-building and developing capabilities of employees
- Monitoring and analyzing the performance and activity of competitors
- Establishment of a system for management and control of projects of delivering the products and services to the customers, reducing the waiting time for receiving goods or services for the customers, enhancing the after-sale services by specifying forces and budget of the organization to actualize them, specifying required facilities for enhancing the advertisement programs and also active presence in the professional exhibitions
- Analyzing the performance and plans of the beneficiaries
- Enhancing the interactions with suppliers and distributors by establishing efficient interactional systems with them

## CONCLUSION

Considering, the current study in a comprehensive qualitative research, the quality and classification of the indexes of both fields of knowledge management and business intelligence can be simultaneously evaluated by academic experts and industrial reporters so that an almost comprehensive classification of the most efficient and the most significant evaluation measures of knowledge management and business intelligence might be presented.

As the assessment of the present study has been conducted based on a five-point Likert scale questionnaire, the results cannot be approved with certainty; hence, it can be asserted that in the future investigations or by using the data of the current study or by collecting new data, the assertions might be evaluated and analyzed by using fuzzy logic.

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