THE EFFECT OF KNOWLEDGE MANAGEMENT ONBUSINESS INTELLIGENCE (THE CASE OF HAMADAN SAHAR FOOD INDUSTRIES)

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Abstract: *Observing the challenges of competitionand the inability of companies to respond to its challenges, this descriptive study sought to evaluate the impact of knowledge management on business intelligence in employees of Hamadan Sahar food industries. For this purpose, out of 110 employees of Hamadan Sahar food industries, 86 were selectedwith random sampling. To collect the data, using the literature, a validated questionnaire by experts and the reliability of .943 was used. Kolmogorov-Smirnov test and a simple linear regression showed a direct positive relationship between the four components of knowledge management (socialization of knowledge, externalization of knowledge, combination of knowledge, and internalization of knowledge) and business intelligence with the significant level of.810; the component of combination of knowledge with a significant of .746 had the most effect on business intelligence of employees of Hamadan Saharfood industry. Consequently, preparing the organizational atmosphere for sharing knowledge and experiences between the employees and supporting them to learn the decision making and problem solving strategies results in improving business intelligence of employees of Hamadan Saharfood industry, and preparesthe company to face the competition challenges.*

Keywords: *knowledge management, business intelligence, socialization of knowledge, externalization of knowledge, combination of knowledge, and internalization of knowledge, Hamadan Saharfood industry*

1. INTRODUCTION

In today's business environment, organizations and companies are always trying to achieve success by outreaching their competitors. The paradigm of competition in the business environment dominates the minds of many of today's executives and managers. Many managers consider in staying ahead of the competition and obtaining their share of demand in the existing marketas the only way to succeed.

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Business intelligence widely enables the managers to gain a new vision and make decision for their business by the process of collecting and analyzing data, and concentrating its nature based on business practices (Zanjirchi & Keshavarzi, 2015). On the other hand, today is the era of knowledge-based organizations. To achieve new sources of knowledge, knowledge management focuses on new theories such as social-oriented knowledge management which aims to achievethe vast customer knowledge (Retna & Tee NG, 2011).

1.1. Statement of the problem

Nowadays, the competitive environment in the global economy has challenged the organizations and companies to achieve a competitive position. The inability of these organizations lays in creating, multiplexing, sharing, and managing theknowledge in organizations. The company planners' lack of knowledge about effective methods of management, feeling that there is no need to learn and use knowledge management techniques in organizations, unprepared staff in terms of skills and experimental techniques, sharing and transfer of knowledge, lack of hardware infrastructure in creating and strengthening inter-organizational networks with the aim of a quick and easy information flow, the existence of unpleasant manifestations of organizational culture such as the unwillingness of individuals to present their professional experience and job knowledge and transfer it to other people and partners leads to loss of market share and competitive advantage. Food companies like Hamadan Sahar food industries (in the increasingly competitive domestic and international environment) are no exception.

2. SIGNIFICANCE OF THE STUDY

In today's world which is called the knowledge-based economy era, it is essential that organizations focus on knowledge and subjects beyond competition issues (Fatimid Moghaddam, 2015). Hamadan Sahar food industries works in the competitive domestic and international market and constantly needs to prepare itself with better management knowledge and experience to deal with the environmental changes and crisis. Identifying and implementing effective processes of knowledge management in the production process of Hamadan Saharenterprise provides the grounds for a more powerful presence andcomprehensive planning in the domestic and international target markets whichleads to an increase in market share. Understanding how to obtain business intelligence in various production processes at Hamadan Saharenterprise is a valuable and important matter in today's complex competitive market which guarantees preserving and increasing market share in the future. Therefore,it is essential that the company pays more attention to the importance of business intelligence and applying it.

1.3. Purpose of the study

This study examined the effect of knowledge management and its components (socialization of knowledge, externalization of knowledge, combination of knowledge, and internalization of knowledge) on the business intelligence of theemployees of Hamadan Sahar food industries in order toapplying the results in the company.

1.4. The main research hypothesis and sub-hypotheses

The main hypothesis: there is a significant relationship between the knowledge management and business intelligence of the employees of Hamadan Sahar food industries.

Sub-hypotheses: each component of knowledge management, including socialization of knowledge, externalization of knowledge, combination of knowledge, and internalization of knowledge has a significant effect on the business intelligence of Hamadan Sahar food industries.

1.5. Research Innovation

The novel aspect of the present research is the practical experience in emphasizing the role of business intelligence in a competitive market in challenging and sensitive industries such as domestic food industry which is due to the lack of previous studies in these industries.

2. THEORETICAL FRAMEWORK AND LITERATURE

Malhotra suggests that knowledge management is a process by which organizations acquire skillsregarding learning (internalization of knowledge), coding knowledge (externalization of knowledge), the distribution, and transfer of knowledge (Abtahi & Salavati, 2006).

2.1. Dimensions of knowledge management

Nonaka and Takeuchi (1995) categorized patterns of knowledge transformation within an organization by its employees which led to the creation of organizational knowledge in four categories which are presented in Fig 1.1:

1. Socialization of knowledge: in the social dimension, people share experiences and their mental models to improve knowledge, including the achievement of mutual understanding through social face to face interaction, sharing views, thinking together and more (Ghorbanzadeh, 2009).

2. Externalization knowledge: in this dimension, implicit knowledge becomes explicit knowledge through externalization process. This process

allows individuals to develop individual concepts and implicit knowledge and then share it with others to create new knowledge. In this strategy, theprinciples of content management for archiving, updating, and retrieval of the externalized knowledge are needed.

3. Combination of knowledge: In thecombination dimension, the existing parsed knowledge is shared, combined, and interpreted. In other words, at this stage, the ideas are combined with a system of knowledge (such as databases). Combination is a method of creating knowledge that is included in the field of education. Examples of combination strategies are knowledge and information systems, preparation of review reports, analysis of process and the summaryof management (Ghorbanzadeh, 2009).

4. Internalization of knowledge: the internalization dimension is a method that transforms the explicit knowledge into implicit knowledge by interpreting the knowledge. This can happen through learning by doing. As soon as the knowledge is internalized, new knowledge is used by the employees, which they have developed and reorganized in their existing implicit database (Ghorbanzadeh, 2009).
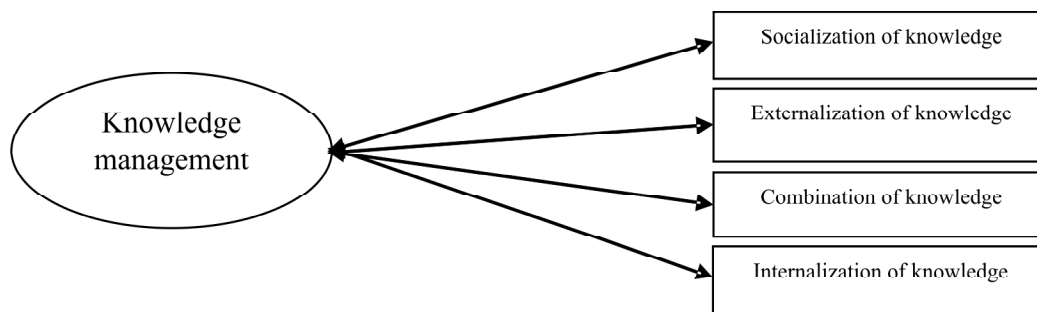

Figure 1.1: Knowledge management model (Nonaka& Takeuchi, 1995)

2.2. Business intelligence: a set of abilities, technologies, tools, and strategies that helps managers to better understand business situations. By implementing business intelligence strategies, the gap between the middle managers and senior managers will be eliminated regarding the perspective of the information relationship,and the necessary information will be provided for managers at any level, at the moment, and with high quality.

2.3. Dimensions of business intelligence model

The research model (fig. 2) which is a three-dimensional model is adopted from the study of information systems by Elbashir *et al.* (2008), which discusses business intelligence in three components (Elbashir *et al.,* 2008).

1. Customerintelligence: customer intelligence has the most benefits in business intelligence. The benefits of customer intelligence is due to better understanding of buying habits of customers, anticipation future needs, and introducing new products/services. Such benefits include the reduction of development and deliver time of new products/services, attracting customers who know what they want, and reduction in the costs of customer dissatisfaction.

2. Inter-organization relationships: the benefits of communicating between suppliers and trading partners includes benefits that organizations gain from improved relations with trading partners, such as reducing transaction costs, increasing collaboration with suppliers and partners, and improving inventory management.

3. Internalefficiency: the advantages of efficiency of internal processes is related to the benefits resulting from improved internal processes, such as increased employee productivity and reduced operating costs (Elbashir *et al.*, 2008).

Figure 1.2: Business Intelligence Model (Elbashir *et al.*, 2008)

4.2. The advantages of business intelligence

The main advantage of business intelligence is that the company can access correct information (when required) and show the performance of the entire companyand each part separately. This type of information are important for the decisions, strategic planning, and competition.

Thampson (2004) in a study about major benefits of business intelligence stated the advantages as follows: fast and accurate reporting, improved decision making, improved customer service, and increasedincome.

2.5. The most important use of business intelligence in organizations

1) Determining the organization's business trends that leads the organizationto focus on other paths to pursue their goals without wasting time, money, and energy. 2) Facilitating decision-making whichis one of the main objectives of business intelligence. 3) Early identification of hazards before they lead to serious risks and identifying business opportunities before their competitors possess it (Saaty, T. L, 2005).

2.6. Strategic importance of business intelligence in decision-making

Use of business intelligence at the strategic level can be considered as a way to help increase both the overall efficiency and optimization process. These systems are focused on some important financial features and other important parameters of increasing efficiency. Different characteristics of applications at different levels of the organization causes differences in the tools, techniques and infrastructure required for each of them. Business Intelligence is the operational part of the task of collecting data and storing them in private databases.

HaghighatMonfared (2010) in a study entitled The Effect ofBusiness Intelligence on Business Processes and Organizational Performance in Iran Khodro Engine R&D and manufacturing Co., categorized the business process into 3 main components of the relationship with suppliers, efficiency, and the relationship with customers. He studied all the managers and experts of the company as the population of the research.The results of the analysis indicated that there was a significant positive relationship between the business intelligence and organizational performance as well as business intelligence and business process (HaghighatMonfared, 2010).

2.7. Conceptual model of the research

The operating model of the present study by use ofNonaka and Takeuchi's knowledge management models and Elbashir's et al. model of business intelligence is presented in Figure 1.3.

3. RESEARCH METHODOLOGY

The present research has applied purposes and is carried out as a survey. Based on random sampling, from the population of 110 personnel in Hamadan Saharfood industry, 86respondants were selected as the sample of the study. To investigate the effect of variables, according to the hypotheses and literature, under the
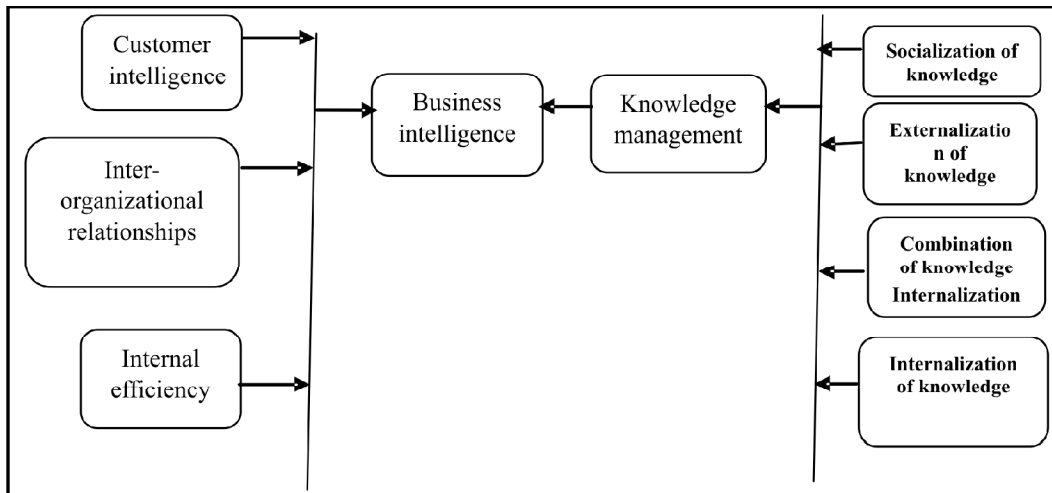
Figure 1.3: The conceptual model of the study (Nonaka& Takeuchi, 1995; Elbashir *et al.*, 2008)

supervision of expert professors, two questionnaires of knowledge management and business intelligence were used (Table 3.1).

Table 3.1
Cronbach alpha values

Variable	Items	Cronbach's alpha coefficient
Knowledge management	1 to 16	.917
Business intelligence	17 to 28	.891
Total	1 to 28	. 943

In the descriptive statistics part (questions about work experience, education, gender and age of respondents),indices of central distribution was used. And in the inferential statistics part, first, Kolmogorov test was used to determine the normality of the data (if the significance level of a variable is larger than .05, that variable's distribution is normal). Then, by comparing the graph oferrors with normal distribution curve, Durbin-Watson test, Kolmogorov-Smirnov test, and linear test were conducted. Analysis of variance was done bySPSS 22 software.

4. RESEARCH FINDINGS

4.1. Examination of normal distribution of the dependent variable

Results of distribution using the Kolmogorov-Smirnov test (Momeni & Faal Ghayoomi, 2012) for the following hypotheses:

$$\begin{cases} H_0\text{: the variables are normally distributed} \\ H_1\text{: the variables are not normally distributed} \end{cases}$$

According to Table (4.1),based on Kolmogorov-Smirnov test, we conclude that because the level of the significance of the variables *knowledge management* and *business intelligence*is greater than .05 (alpha), the null hypothesis is confirmed and both variables are normally distributed. But the scales of knowledge management are not normally distributed. So,the condition of normal distribution of the dependent variable is satisfied, too.

Table 4.1
Kolmogorov-Smirnov test

Variable	Statistics of the test	Significance level
Socialization of knowledge	.127	.002
Externalization of knowledge	.124	.002
Combination of knowledge	.15	.000
Internalization of knowledge	.192	.000
Knowledge management	.093	.063
Business intelligence	.088	.097

4.2. Testing the main hypothesis

Knowledge management has a significant and positive relationship with business intelligence in HamadanSahar food industry.

$$\begin{cases} H_0 : \beta \text{ there is no significant relationship } 0 = {}^2\text{: } H_o \\ H_1 : \beta \neq 0 \text{ there is a significant relationship} \end{cases}$$

The above hypothesis was tested by Simple Linear Regression; the results are presented in Table (4.2).

Table 4.2
The summary of regression model

model	Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	Standard error of estimate
1	.810	.656	.652	.36305

In Table 4.2, the coefficient of determination is, in fact, the percent of total variability due to regression on x which here is equal to .656.

Table 4.3
Analysis of variance regression model

model		Sum of squares	Degrees of freedom (df)	Average of squares	F	Significant level (sig)
1	Regression	21.090	1	21.090	160.014/	.000
	Remaining	11.071	84	.132		
	Total	32.161	85			

Table 4.3 is used for Analysis of Variance to see if there is a linear relationship between the independent variables and the dependent variable. The statistical hypotheses of the significance test of the whole regression model is as follows:

$\begin{cases} H_0: \text{there is no linear relationship between the two variables} \\ H_1: \text{there is a linear relationship between the two variables} \end{cases}$

Since the level of significance of the regression model is less than $\alpha = .05$, H_0 is rejected and the hypothesis of a linear relationship between the two variables is confirmed, thus, the regression model is statistically significant.

Table 4.4
Coefficients of the regression model

Variables	Unstandardized coefficients		Standardized coefficients	T-statistics	The level of significance
	B	SD	Beta		
Constant	.533	.187	.810	2.855	.005
Knowledge management	.806	.064		12.650	.000

As the results in Table 4.4 reveals, since the level of significance of the test is less than .05, H_1 is confirmed which means knowledge management has a significant and positive relationship with business intelligence.

Based on the numbers presented in column B, regression equation of this hypothesis can be written as follows:

$$y^\wedge = .533 + .806 \, x$$

In the above table, the column of standardized beta coefficient indicates that knowledge management has a direct and positive effect on business intelligence, that is, for a unit of change in this variable, .810unit of change happens in the variable of business intelligence. Or in other words, for one unit increase in this variable, there is.810unit increase in the variable of business intelligence. Based on these results we can claimthat knowledge management has a significant and positive effect on business intelligence of the employees in HamadanSahar.

4.3. Testing the sub-hypotheses

To be precise, only regression coefficients tables for each hypothesis are presented.

Hypothesis 1: the socialization of knowledge has a significant effect on business intelligence in Hamadan Saharfood industry.

$$\begin{cases} H_0 : \beta \text{ there is no significant relationship } 0= \\ H_1 : \beta \neq 0 \text{ there is a significant relationship} \end{cases}$$

Table 4.5
Coefficients of the regression model

Variables	Unstandardized coefficients		Standardized coefficients	T-statistics	The level of significance
	B	SD	Beta		
Constant	1.201	.234	.618	5.145	.000
Socialization of knowledge	.535	.074		7.206	.000

According to Table 4.5, since the level of significance of the test is less than .05, H_1 is confirmed which means there is a significant and positive relationship between socialization of knowledge and business intelligence. And for each unit of increase in this variable, .618 unit of change happens in the competition advantage.

Hypothesis 2: the externalization of knowledge has a significant effect on business intelligence in HamadanSahar food industry.

$$\begin{cases} H_o : \beta \text{ there is no significant relationship} \\ H_1 : \beta \neq 0 \text{ there is a significant relationship} \end{cases}$$

Table 4.6
Coefficients of the regression model

Variables	Unstandardized coefficients		Standardized coefficients	T-statistics	The level of significance
	B	SD	Beta		
Constant	1.179	.179	.743	5.989	.000
Externalization of knowledge	.628	.062		10.172	.000

According to the results presented in Table 4.6, since the level of significance of the test is less than .05, H_1 is confirmed which means there is a significant and positive relationship between externalization of knowledge and business intelligence.

Hypothesis 3: the combination of knowledge has a significant effect on business intelligence.

H_o: β there is no significant relationship

H_1: β ≠ 0 there is a significant relationship

Table 4.7
Coefficients of the regression model

Variables	Unstandardized coefficients		Standardized coefficients	T-statistics	The level of significance
	B	SD	Beta		
Constant	1.043	.181	.746	5.776	.000
Combination of knowledge	.624	.061		10.267	.000

According to the results presented in Table 4.7, since the level of significance of the test is less than .05, H_1 is confirmed, which means there is a significant and positive relationship between combination of knowledge and business intelligence.

Hypothesis 4: the internalization of knowledge has a significant effect on business intelligence.

H_o: β there is no significant relationship

H_1 : β ≠ 0 there is a significant relationship

Table 4.8
Coefficients of the regression model

Variables	Unstandardized coefficients		Standardized coefficients	T-statistics	The level of significance
	B	SD	Beta		
Constant	1.202	.197	.684	6.108	.000
Internalization of knowledge	.607	.071		8.592	.000

According to the results presented in Table 4.8, since the level of significance of the test is less than .05, H_1 is confirmed, which means there is a significant and positive relationship between internalization of knowledge and business intelligence.

5. DISCUSSION AND CONCLUSION

Today, using business intelligence to deal with the competitive challenges in companies and organizations is essential. In this study, similar to the results of the

research conducted by the HaghighatMonfared, the effect of knowledge management on theimprovement of business intelligence of the population of the research was confirmed. The current study showed that the combination of knowledge in comparison with the other components of knowledge management had the most influence on business intelligence of the staff of HamadanSaharfood industries. As a result, the preparation of organizational atmosphere for sharing knowledge and experience among employees and supporting them to update their knowledge and professional skills and empowering them in decision-making and knowledge management, and learning problem-solving techniques leads to promotion of intelligence in the employees of HamadanSaharfood industries, from the dimension of combination of knowledge.Also, an increase in the presence of high-level managers in different units and increase in the level of communication and exchange of information between operational-level employees with high-level managers and support of senior management to apply the knowledge production and promoting continuous production program can also improve the business intelligence from the perspective of socializingof knowledge. With the approval of the effect of externalizing of knowledge on business intelligence, the managers of Hamadan Sahar food industries can try to stablishtrust in support of orienting and acceptance of knowledge at the company. On the one hand, with the approval of the effect of internalizing knowledge on business intelligence of the workers, the use of information and communication technologies and electronic devices with high security and speed to transfer the information can also be suggested to Hamadan Sahar food industries. As a result, this company can utilizes the knowledge management components to promote business intelligence of its staff, and in fact, by relying on the updated information and knowledge achieve a correct, timely, and proper analysis of its situation and the situation of the market and other competitors and becomes equipped with the most powerful tool to deal with competitive challenges.

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