

Development of Nonaka and Takeuchi knowledge management cycle from perspective of emotional intelligence (Case study: Selected employees of the Securities & Exchange Organization)

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Abstract

Nature of knowledge is such that it should be self-managing. According to theoretical arguments, managing this huge capital is affected by individuals' psychological and emotional intelligence. Organizational culture and organizational commitment are key factors significantly influencing on the preparation and adoption of new technology systems, such as knowledge management systems. Organizational culture has a dramatic impact on organizational commitment and knowledge management. Thus, organizational cultures have been explored in this study. The descriptive-survey research method was employed in this paper. According to the type and size of their projects, organizational culture was estimated as bureaucratic in seven organizations. The Quinn organizational culture questionnaire along with several interviews with managers verified the bureaucratic culture in four organizations. The applied tool for data collection was a questionnaire consisting of 33 questions. Moreover, the sample size was 398 employees in four organizations. Reliability coefficient of the questionnaire was obtained using Cronbach's alpha coefficient while face validity and content validity were confirmed by experts.

The five dimensions of emotional intelligence presented by Goleman were measured in the concerned organizations. Added to that, the dimensions of knowledge management cycle were assessed according to four aspects of Nonaka and Takeuchi model. The results demonstrated that in the bureaucratic cultures, externalization and combination are in a suitable status. The data analysis revealed that the individuals' abilities in different dimensions of knowledge conversion are related to different aspects of emotional intelligence. For instance, individuals' ability in social skill and empathy has a positive and significant relationship with socialization.

Keywords: bureaucratic culture, knowledge management, four-dimensional model of Nonaka and Takeuchi, emotional intelligence

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Introduction

The rapid development of information technology has entailed changes in the economy, which has increased the importance of knowledge every day [1] [2] [3]. These variations have caused that the traditional bases of economic power are no longer considered as the fundamental factors for businesses, and instead, knowledge is considered as a competitive advantage for organizations [4]. As Drucker stated, knowledge can be replaced with equipment, capital, machinery, and manpower and has played a role as the most important element in many industries [5].

In other words, the broad developments of information technology in recent years have led to formation of the global economic system and preparation of active players for dynamic industries [6] [7]. These changes have directed the industries to employ different management practices, such as total quality management (TQM), business process re-engineering (BPR), enterprise resource planning (ERP), supply-chain management (SCM), customer relationship management (CRM), e-commerce (EC), and knowledge management (KM) in order to cope with the extensive changes in the business environment [8] [9] [10] [11] [12] [13]. As an example, a large number of corporations are now making use of knowledge management to improve customer service, reduce costs, enhance their decision-making process, and induce innovation among their staff [14] [15].

It should be taken into consideration that creating and developing an organizational culture with thorough concentration on the creation, sharing, and use of knowledge is considered as a vital step for the success of knowledge management systems [16] [17] [18]. If an organization has not established an appropriate culture for knowledge sharing, this process would become very difficult and limited [19] [20]. Organizational structures are of a remarkable effect on knowledge management activities [21]. In this area, widespread discussions added to many scientific papers have been published on the impact of organizational culture on knowledge management activities [22].

Therefore, before implementing a new technology in the organization, understanding these technologies and integrating them into the organization's human and cultural aspects is an essential task to ensure the successful KM programs. Eisner believed that almost all the strategic activities are affected by organizational culture and vision [23].

Although numerous researches have considered the organizational culture as an important factor for successful knowledge management [24], very little research has been accomplished on the effect of this culture on knowledge transfer. One of the main goals of this research is to evaluate the four dimensions of knowledge transformation in the bureaucratic culture.

There is a consensus among academics that knowledge is a personal matter and is lied in the mind of individuals. In this regard, Davenport and Prusak [25] wrote that knowledge exists among people, and is a part of human complexity. From that perspective, if people manage their knowledge appropriately and share it with other people inside the organization, they can give more benefit to themselves, other persons, and the organization [26]. On the other side, Alpushka stated that since the emphasis of organizational knowledge is mainly on workers, qualitative management of this knowledge is of extreme importance. Added to that, it can be claimed that no one can manage this knowledge as effective as its owner [27].

Overall, while addressing the necessity of knowledge management and the relationship between knowledge management in one hand, and human characteristics and organizational culture on the other hand, this study has attempted to evaluate the effect of bureaucratic culture on knowledge conversion and to assess the relationship between the dimensions of emotional intelligence and the dimensions of knowledge conversion.

2- Literature Review

2-1 Emotional intelligence

According to Salovey and Mayer, emotional intelligence includes the ability to monitor the feelings and capabilities of oneself as well as other people and also distinguish them during the tasks. Emotional intelligence is typically used to conduct personal thoughts and behaviors among people. After such explanations, both writers provided another definition on emotional intelligence, which is quiet widely accepted [28]. They defined emotional intelligence as the ability to understand feelings, to manage feelings for easier and more efficient thinking, and to adjust feelings for personal promotion [29]. In general level, emotional intelligence is the ability to recognize the feelings in the first place and to manage them accordingly [30]. In another definition by Mayer [31], emotional intelligence is defined as the capability for an accurate argument on feelings and to use such emotional feelings and awareness to promote thinking. Briefly, it can be said that emotional intelligence helps us to recognize our and others' emotional moods and then, use it to realize our feelings and progress our behaviors and actions in practice. People with higher emotional intelligence are more successful in building interpersonal relations and acquiring others' supports. In the book on emotional intelligence, Goleman argued that the importance of feelings in human life is more than its rational part [32] [33].

In this paper, the Goleman model and the related questionnaire were used due to its closeness with management topics and the opinions of experts. Goleman believes that the three first aspects of emotional intelligence are related to self-management skills and the two aspects of empathy and social skills are related to the ability of making relations with others [32]. A more detailed explanation of this model is presented in Table 1.

Table 1. Goleman model [32]

Dimension index	Description
Self-motivation	Commitment: dedication to the group's or organization's objectives
	Optimism: perseverance to achieve the goals rather than complaining for problems
	Initiation: readiness to exploit opportunities
	Growth orientation: trying to progress or achieve superior standards
Self-management	Adaptation: flexibility to accept the change and then maintain it
	Dutifulness: accept the responsibility against the personal performance
	Reliability: preserving honesty and truthfulness criteria
	Self-control: preventing emotional disorders and avoiding tensions
Self-awareness	Emotional awareness: recognizing and understanding one's emotions or realizing their effects
	Self-assurance: feeling own aptitude, worthiness, and capability
	Self-evaluation: recognizing or understanding weaknesses, strengths, and existing limitations
Social skill	Cooperation: team work to achieve common goals
	Conflict management: resolution of issues through conversation
	Influence: applying influential techniques to convince others
	Communication: listening effectively and sending acceptable messages
	Leadership: boosting morale and guiding the group members
Empathy	Understanding others: recognizing others' emotions and viewpoints and realizing their impact on decisions
	Guiding variety: development of opportunities by employing people from various cultures and races

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	Service orientation: prediction, identification, and then satisfaction of people's needs
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2-2 Knowledge conversion

Nonaka asserted that knowledge is convertible. He postulated four stages of knowledge conversion, called SECI. Nonaka and his colleagues believe that there are two types of knowledge in organizations: implicit knowledge and explicit knowledge [34]. They stated in their model that knowledge transformation is a helical process in which these two types of knowledge are transformed into each other. Four major states of knowledge conversion are as below:

- 1- **Socialization** is the process of converting tacit knowledge into new tacit knowledge, which is established through making close relations between members and as a result, the implicit knowledge is enriched. It is necessary to have a common culture and the ability to perform tasks in a group in order to conduct socialization effectively [35]. In another definition, the knowledge that is created through socialization is called empathy knowledge [36].
- 2- **Internalization** is the process of expressing the explicit knowledge in the format of tacit knowledge. This step is led to creation of new implicit knowledge through acquiring the new implicit knowledge from the current explicit knowledge [37].
- 3- **Combination** is the process of converting explicit knowledge into more complex and systematic sets of explicit knowledge. It occurs when conversion is performed between explicit knowledge and implicit knowledge [8].
- 4- **Externalization** is the process of articulating tacit knowledge into explicit knowledge. Thus, the obtained new knowledge would become useable for everyone. In other words, in this aspect, the knowledge in people's minds, which could not be presented and perceived collectively, is transformed as a transformable knowledge for people [37].

2-3 Organizational culture

Organizational culture is defined as an important factor in shaping organizational growth trends (Jernigan and Slokum, 2007) [38], integrating organizational capabilities (Day, 1994) [39], making solutions to face problems (Shine, 1984) [40], and overcoming barriers or paving the ground for achieving organizational aims (Denison, 1990) [41].

Ferraro defines organizational culture as what people as community members think or do [42]. Organizational culture is considered as the most important social behavior criterion and actually shows the personality of an organization [43]. It conducts employees in building relations and in their daily behaviors. As each person has his/her own unique traits, organizations are also recognized by their unique attributes [44]. This fact would indicate the unique culture of organizations [8]. An organizational culture has a strong impact on organizational structure, trends, and the process of monitoring and controlling. Organizational culture typically consists of confirmed laws, behavioral principles and methods, which have been shaped by people's general beliefs during time [45]. Quinn (1999) introduced four types of culture: tribal, adhocracy, bureaucracy and market [46]. In bureaucratic culture, organizational workplace and structure are formal and they monitor the members' actions. It is worth to note that these four organizational cultures treat internal information in different manners [47].

3- Methodology

Based on our investigations, the surveyed organizations enjoy widespread knowledge and experiences from their experts in many fields such as power, mechanics, management, so on. They are generally involved in numerous and diverse projects. In these four organizations, a huge volume of

knowledge is generated due to the broadness and diversity of their operations, a part of which is recorded in the format of evidences, documents, and reports. Another part of such knowledge is intangible in the format of hidden experiences, relations, and skills in the minds of people and there is a low chance in reutilization or transfer of such knowledge.

Lack of sharing and also reutilization of the generated knowledge indicates the lack of productivity in the organization. Since intangible knowledge is hidden in the people's minds, leaving the organization by those knowledges (for any reason) would lead to losing such knowledge. In the surveyed organizations, many knowledge workers were about to be retired. A huge volume of knowledge is regularly generated, but the dominant culture of such organizations does not support the knowledge management activities. Hence, executing knowledge management systems with the aim to impact on identifying, generating, stocking, reviving, transferring and utilizing the knowledge appears to be necessary.

Initially, 7 industrial organizations were selected to conduct the present study in bureaucratic organizations. The preliminary speculation was that they possess bureaucratic culture due to their sizes and projects. Then, Quinn organizational culture questionnaire was implemented in all seven organizations to confirm our speculation. According to the results gained from Quinn organizational culture questionnaire, the dominant organizational culture in four bureaucratic organizations was verified. As the next step, their managers and personnel were interviewed. Consequently, the type of the organizational culture was determined by the authors.

A four-segment questionnaire, including demographic information, organizational culture, and emotional intelligence, and knowledge conversion questions was employed in the present study. The organizational culture questions had three choices, which distinguished the types of the organizational cultures. Emotional intelligence and knowledge conversion questions were selected by Likert five-item scale. The validity of the questionnaire was supported by elites while its reliability was computed by Cronbach's alpha as 0.89, which is considered as a plausible figure.

The respondents with common knowledge traits were selected. To the same reason, people holding academic degrees were chosen in all 4 organizations. A part of participants consisted of deputies / supervisors while another part consisted of managers, including HR managers and the experts in the field of knowledge management and R&D. Moreover, data collection was carried out in spring and summer 2013. Sample size was computed by Cochran's formula and finally, 398 plausible questionnaires were returned. In each of the four organizations, 73%, 81%, 67% and 77% of the employees selected bureaucratic culture as their dominant organizational culture in their organizations, respectively. Concerning the two other parts of the questionnaire, it was attempted to investigate the association between emotional intelligence and knowledge conversion by the use of correlation test to compare four aspects of knowledge conversion in bureaucratic culture through the average test.

3-1 The organizational culture questionnaire

The questionnaire was developed with regard to the Quinn's four dimensions of culture. This questionnaire with 3 questions was designed based on the individuals' agreement with each of the four options through which the kind of organizational culture can be detected by corresponding the selected answer. In addition, its internal consistency was 0.77 based on alpha coefficients.

3-2 Emotional intelligence questionnaire

This questionnaire was proposed by H. Wizing and was introduced as the emotional intelligence questionnaire in his book. It has 25 items, which measure the emotional intelligence of the people. Each person can obtain a score between 25 and 125 and the higher score would show the higher emotional intelligence. The scores between 50 and 100 show the medium emotional intelligence and the scores less than 50 represent the low emotional intelligence. According to this and the obtained results, 65% of the respondents had medium emotional intelligence, 4% had low emotional intelligence, and the remained 31% had high emotional intelligence. Reliability of the questionnaire was equal to 0.93, 0.90, 0.84, 0.71, and 0.77 for self-awareness, self-management, self-motivation, empathy and social skill aspects, respectively.

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3-3 Knowledge conversion questionnaire

Given this fact that identifying the status of knowledge transformation in adhocratic culture was one of the purposes of this survey, the questionnaire related to this issue was exploited, which has been frequently applied in reliable articles. This questionnaire consisted of eight questions related to four dimensions of knowledge transformation and the options were arranged as "totally disagree, disagree, no idea, agree, totally agree". Its reliability has been approved in many studies and it has a good validity as well [8] [37].

Correlation coefficient among the dimensions of knowledge transformation was calculated equal to 0.522, 0.714, 0.686, 0.510, 0.619, and 0.597, respectively and internal consistency was equal to 0.829 based on the alpha coefficient [37].

Internal reliability of the questionnaire in this test based on alpha coefficient was equal to 0.83, 0.73, 0.77 and 0.83 for socialization, externalization, combination, and internalization aspects, respectively. Furthermore, experts confirmed the validity of the whole questionnaire.

4- Data analysis

4-1 Analysis of mental information

Table 2 shows the demographic status of respondents.

Table 2. The demographic status of respondents

Row	Index	Status
1	Gender	(50%) male, (50%) female
2	Age	(20%) less than 30 years, (42%) between 30-35 years old, (18%) between 35-40 years old, and (20%) more than 40 years old
3	Education	(2%) associate, (50%) bachelor, (44%) master, and (4%) doctorate degrees
4	Occupation	(50%) experts, (20%) supervisors, (19%) deputies, and (11%) managers
5	Work experience	(50%) less than five years, (20%) between 5-10 years, (25%) between 10-15 years, (5%) more than 15 years

4-2 The impact of demographic factors on knowledge transformation and emotional intelligence

According to the results shown in Table 3, education and work experience have a significant impact on emotional intelligence and knowledge transformation. Therefore, a positive relationship can be observed between education, knowledge transformation, and emotional intelligence. It means that if the individuals have higher level of education, they will be more successful in the process of knowledge transformation. Meanwhile, the scores of individuals' emotional intelligence are increased for higher education levels. Similar results were observed about the individuals' work experience. In other words, based on the findings, the more the work experience, the better the capability of individuals in knowledge transformation and emotional intelligence will be.

It is noteworthy that the obtained significance level confirms the above results. No relationship was observed among other demographic information, knowledge transformation, and emotional intelligence.

Table 3. Results of correlation test

	Occupation	Education	Work experience	Age	Gender
Knowledge conversion	0.152(*)	-0.61	0.589(**)	0.044	0.377 (*)
Emotional intelligence	0.143(*)	0.172	0.219(*)	0.051	-0.138

4-3 The status of knowledge transformation dimensions in the adhocratic culture

According to the obtained results of the mean test presented in Table 4, it can be seen that the mean of the four dimensions of knowledge transformation is equal to 3.6326. This occurs while the third option in the questionnaire is regarded as neutral. But the status of socialization and internalization aspects is in a way that the obtained mean for these two dimensions is in the range of 3.5 to 4.5 with 95% probability. It indicates that these two aspects have a very suitable status in the adhocratic culture. With regard to two other aspects, i.e., externalization and combination, considering the obtained mean, although they are not positioned in a suitable status, their mean is more than 3 and is nearly acceptable. Moreover, it should be stated that externalization has a more suitable status compared with the combination. The results are illustrated in Table 4.

Table 4. Results of mean test

Knowledge transformation	Effective factors	95% Confidence interval of the difference		Sum of mean
	Socialization	2.1346	2.6863	
Externalization	3.7123	3.6540		
Combination	4.7901	3.5115		
Internalization	3.4433	2.7764		

4-4 The relationship between emotional intelligence and knowledge transformation

Having studied Table 5, it can be observed that there is a positive correlation among "socialization" and four aspects of "self-awareness", "self-management", "empathy", and "social skill". This relationship is confirmed considering this fact that the significance level is equal to zero. The more capabilities the individuals have in these four aspects, their capability in "socialization" will be increased. According to the obtained results, there is a positive and significant correlation between "sympathy" and "social skill" and the relation is stronger in the "sympathy" dimension. Added to that, the combination aspect has a positive correlation with "self-motivation". The positive correlation of "internalization" with "self-management" and "self-motivation" is acceptable. The results of correlation test are illustrated in Table 5.

Table 5. Results of correlation test

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		Self-awareness	Self-management	Self-motivation	Empathy	Social skill
Socialization	Pearson	-0.078	-0.125	-0.089	0.276**	0.265*
	Sig. (2-tailed)	0.378	0.759	0.329	0.000	0.000
	N	398	398	398	398	398
Externalization	Pearson	0.256**	-0.101	0.077	0.287*	0.270**
	Sig. (2-tailed)	0.011	0.221	0.285	0.034	0.000
	N	398	398	398	398	398
Combination	Pearson	-0.029	0.229*	0.199*	-0.084	-0.191
	Sig. (2-tailed)	0.427	0.000	0.001	0.431	0.111
	N	398	398	398	398	398
Internalization	Pearson	0.128	0.129	0.223**	-0.069	0.080
	Sig. (2-tailed)	0.151	0.164	0.145	0.409	0.512
	N	398	398	398	398	398

The model was $Y=0.908X_1+1.000X_2+0.657X_3+0.916X_4+2.911X_5$ (where x_1 is Self-awareness, x_2 is Self-management, x_3 is Self-motivation, x_4 is Empathy and x_5 is social skill). All showed a positive relationship. The adjusted R is 0.579 and the explainability for all variables is pretty good.

Table 6. The multiple-regression analysis

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.009	.001		1.786	.078
Self-awareness	.908	.002	.888	234.814	.000
Self-management	1.000	.003	.945	254.022	.000
Self-motivation	.657	.004	.912	254.345	.000
Empathy	.916	.003	1.547	247.523	.000

Social skill	2.911	.007	3.423	443.694	.000
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5 - Discussions

It should be noticed about the role of organizational culture in knowledge management that knowledge management in organizations will become limited, if the organization does not acquire appropriate culture for knowledge sharing. On the other hand, knowledge transformation is a social process in which the individuals with different knowledge are involved. Such a transformation could lead to knowledge growth at both quantitative and qualitative dimensions. In addition, knowledge is not a physical material, but an intangible asset. It is because of its psychological characteristics. Researchers have greatly emphasized on the role of human factor and accentuated that knowledge sharing needs to be considered as a human activity. As a result, this activity is of all the strengths and weaknesses of any human performance. Consistent with this information, it can be conjectured that human characteristics play an important role in social interactions for knowledge creation.

In investigating the effect of demographic factors on knowledge transformation and emotional intelligence, it was found that the individuals with high emotional intelligence are in high positions in the organization. The very important reason can be this fact that emotional intelligence is an effective factor in career advancement and success. It was also found that the more the work experience is, the higher the emotional intelligence will be and in other words, the more the ability to control their effects will be.

With regard to knowledge transformation, it was comprehended that the individuals in higher positions in organizations are of more capabilities. In this regard, it was found out that the higher the work experience is, the higher the higher the success in knowledge transformation will be.

With respect to the role of organizational culture, it can be seen that at low averages of socialization, the internalization is evident in the bureaucratic culture. Since socialization is generally performed through close connections in the workplace, any weakness in this factor is likely due to this fact that the bureaucratic organization is faced with fundamental problems in encouraging employees to share their personal feelings and experiences. On the other hand, the dry and inflexible climate associated with this organizational culture has caused to another problem where employees perform poorly in learning new skills through observation, imitation, and practice. The two other dimensions of knowledge transformation (including composition and externalization) had higher averages, indicating the appropriate status of these two dimensions, in comparison with internalization and socialization. The reason might relate to this matter that the documentation rules in the bureaucratic organizations are relatively tight and acceptance of many projects is related to delivery of the high volume of documents. Utilization of the information technology platform for circulation of knowledge, especially in the documentation process is a proof for the mentioned point. The achieved results on the impact of organizational bureaucratic culture on knowledge conversion process are compatible with the findings by Tseng [37]. These results do not match the findings by Jennex and Wilm et al. They had concluded that organizational culture and structure impose no barrier for knowledge sharing and rather, they are the methods of knowledge sharing that should be particularly taken into consideration. Additionally, the findings do not match the Chim's research. He proved the negative impact of the organizations' bureaucratic culture on knowledge sharing.

In organizational bureaucratic culture, the majority of employees think that knowledge management activities are merely related to managers and hence, they have no responsibility in this regard. Walczak found that organizational structures have a remarkable impact on knowledge management activities [21].

Regarding the relationship between emotional intelligence and the dimensions of knowledge transformation, it can be noted that there is a positive correlation between socialization and empathy and social skills. This correlation is reasonable, because socialization is made by the close

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relationship between two individuals, and therefore, this dimension may become even stronger if both sides are of more abilities to work as a team. In fact, team working is one of the characteristics of the social skills that leads to the ability to communicate with others and understand their feelings.

Externalization is another dimension of knowledge transformation, which is of positive correlation with the following three dimensions: self-awareness, empathy and social skills. The reasons for this positive correlation can be expressed in this way that externalization is the process of transforming implicit knowledge into explicit knowledge, and then, it requires expressing implicit knowledge in an understandable way for everyone. As a result, it needs the ability to correct the communications with others. The ability to communicate with others, influence on others, persuade them, and develop effective relationships with others are the specifications of empathy and social skills. In addition, self-awareness directs people to understand their own emotions, help others express their feelings in an appropriate and constructive way, and consequently help themselves to establish effective communications. Overall, based on the mentioned reasons, they can help people to be successful in transferring their implicit knowledge through expressing their ideas in the community.

The positive relationship between composition, and self-motivation and self-management can be stated in the way that people with self-motivation are constantly prowling towards progress and they are always prepared to make use of the opportunities. On the other side, persons with self-management are able to manage their emotions, are flexible in facing changes. Such properties have caused their success in the “composition”. Self-motivation features also lead to a positive correlation between this dimension and internalization.

Conclusions

Despite the theoretical evidence and arguments about the relationship between knowledge transformation, emotional intelligence, and organizational culture, no comprehensive study has been done in this regard. In this study, the relationship between the five dimensions of emotional intelligence (self-awareness, self-motivation, empathy, social skills) and four dimensions of knowledge transformation (socialization, externalization, internalization and composition) in knowledge management were evaluated using statistical methods such as mean and correlation tests. These investigations showed that the higher the abilities in empathy and social skills are, the higher the abilities in transforming implicit knowledge will be, and this ability has emerged in both externalization and socialization. Self-motivation as a factor indicating the persons’ interest in development and use of opportunities has shown its positive effect on both composition and internalization. The mean test also confirmed that the status of composition and externalization was better than internalization and socialization in bureaucratic cultures, and is also better in both internal and external dimensions of the combination and socialization. It should be noted that the mean obtained for both composition and externalization is higher than the two other dimensions.

Concerning the dominant culture in the surveyed organizations, their managers are recommended by the authors of this paper to remove the knowledge management cultural barriers through holding constant workshops, establishing elites’ associations, acknowledging knowledge management experts, organizing brainstorming sessions, building the culture to record the knowledge into software systems on daily or weekly basis, and publishing knowledge management journals by their personnel.

Regarding the impact of emotional intelligence on knowledge management activities, the managers are highly recommended to respect the employees’ feelings, give importance to non-verbal communications, listen to employees’ suggestions, and explain the importance and role of emotional intelligence in employees’ life success through consistently organizing relevant workshops and directing employees to improve such psychological components. Future research in this field can study this subject in the organizations with different behaviors and attitudes, and can attend the relationship

between other types of organizational cultures with the dimensions of knowledge transformation and emotional intelligence.

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