



Knowledge Processing Style; A Successful Pattern in the Third Millennium

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Abstract

This investigation was done with the goal of presenting a successful model of knowledge processing style in Islamic Azad University of Tehran. The current research study is a developmental research in terms of purpose and a descriptive survey research in terms of data collection method. The statistical population of this study includes two groups of experts familiar with the knowledge processing style, and managers and staff of the Islamic Azad University of Tehran. A sample of 30 experts and a sample of 301 managers and staff of the Islamic Azad University of Tehran were chosen, and a questionnaire whose validity and reliability were confirmed was used to collect data. The collected data were analyzed through using factor analysis and analysis of variance. The obtained results demonstrated that task, organizational culture, information technology, organizational structure are the key determinants of knowledge processing style in Islamic Azad University of Tehran.

Keywords: Information Technology, Knowledge management, Knowledge processing style, Organizational culture, Organizational Structure,

Introduction

In the third millennium, knowledge is considered as one of the most significant strategic resources of organizations and the ability of an organization to maintain sustainable growth and competitive position depends on the kind of knowledge capital management (Song, 2008). Knowledge is a very significant and essential resource that enables organizations to update themselves through learning and applying the resources

of other organizations. In the current highly competitive and vastly changing environment, organizations must take the initiative by creating new knowledge, integrating existing knowledge with new knowledge, and gaining superior competencies. So, knowledge management plays a crucial role in increasing the efficiency and productivity of organizations (Sing & Gupta, 2014).

Although there is a wide literature on knowledge, types of knowledge and knowledge management, and numerous researchers and writers have discussed about it, based on the reviewed resources, little effort has been made on the subject of knowledge processing styles and related factors in organizations so far. It seems that in cases that the design and implementation of knowledge management have been done without considering the different strategies or styles of knowledge processing and related factors, which determine the type of knowledge processing style, the probability of failure has increased and caused the waste of resources. Therefore, despite the great emphasis of organizations on knowledge management, there are still unanswered questions that have not yet been clearly responded. Questions such as why with this amount of information about knowledge and knowledge management, many organizations are still unable to preserve their knowledge capital? Or what factors make an individual, a unit or an entire organization select a particular style of knowledge processing? The fact is that the answer to these questions is not possible without having a clear and practical model. Because some organizations or their different units are different in terms of the nature of work, the organizational culture dominating them, the type of information technology used, the size of the organization, learning strategies or individual characteristics of employees; and of course the type of knowledge they work with is also different. It is natural that the

type of style used to process their knowledge should also be different.

The weakness of educational centers in designing a suitable model for knowledge processing may be sought somewhere else; knowledge management is a topic that is mostly discussed in the field of economics and business so that people get the awareness and knowledge needed for better marketing and selling products, and use it to increase productivity in their organizations. In recent years, this issue has also penetrated into non-market and non-economic organizations such as universities and research centers, and has been considered by them. Due to the novelty of this issue in educational centers, it seems that this issue has not yet found its true position in the strategic planning of universities, especially the Islamic Azad University of Tehran.

Research Background

Knowledge processing style as a competitive program supports the organization to create and exchange knowledge and leads to the provision of valuable goods and services, and the complete accomplishment of customer expectations (Lo & Ng, 2015). Elsewhere, knowledge processing style or strategy has been mentioned as the way in which an organization manages its knowledge capital (Vanderhorst, 2011).

Knowledge processing style in organizations depends on the type of knowledge (tacit, explicit) that a unit in the process of knowledge management, creation, transfer, storage and application which deals with it is different. Organizations or units that deal



with explicit knowledge prefer to use the coding processing style, and organizations or units that deal with tacit knowledge mostly use a personalized style and use the hidden knowledge of their employees to solve problems (Song, 2008). (Song, 2008) have classified the organization's general approaches to knowledge management functions into two styles or strategies: "codification style" and "personalization style".

Codification style improves the registration and reuse of knowledge by providing tools for effective storage and retrieval, and provides easy access to knowledge throughout all organizational boundaries. However, it greatly facilitates the coding, search and retrieval of knowledge. Organizational units can benefit from the knowledge coding by effectively performing their routine and repetitive activities in written forms like (manuals, databases, repositories, etc.) (Song, 2008).

Personalization style focuses not on recording knowledge in a database, but on interpersonal conversations, brainstorming sessions, and one-on-one interactions

between people. In this approach, knowledge was acquired not only through face-to-face interactions but also through electronic communications such as networks composed of individuals (Song, 2008).

Choosing a type of knowledge processing style in organizations depends on several factors. The most important determinants of knowledge processing style identified and studied in this study are task, organizational culture, information technology and organizational structure.

The present study has identified the factors related to knowledge processing styles in Islamic Azad University of Tehran through exploratory studies and then analyzed the factors related to knowledge processing styles using quantitative methods, then presented a model for knowledge processing at the Islamic Azad University of Tehran. The summary of studies and research conducted on knowledge processing style displays that the factors related to knowledge processing styles include the following four factors: task, organizational culture; Information Technology; Organizational Structure (Table 1).

Table 1. Factors related to knowledge processing style

Organizational factors affecting knowledge processing style	References
Duty	(Song, 2008) and (Clay, 2006)
Organizational Culture	(Song, 2008) and (Jasimuddin et al. 2008) and (Winsperger & Gorovaia, 2010)
Information Technology	(Song, 2008) (Venkitachalam & Willmott, 2016) and (Jasimuddin et al. 2008) and (Clay, 2006)
Organizational Structure	(Venkitachalam & Willmott, 2016) and (Jasimuddin et al. 2008)

Also, according to conducted studies, the types of knowledge processing styles are as follows (Table 1):

Table 2. Knowledge processing styles

Knowledge processing styles	References
codification	(Song, 2008)and(Venkitachalam & Willmott, 2016) and (Prathanadi, 2011)and (Jasimuddin et al. 2008)
Personalization	(Song, 2008)and(Venkitachalam & Willmott, 2016) and (Prathanadi, 2011)and (Jasimuddin et al. 2008)

Based on the previous research studies and also reviewing the research literature, the researcher has designed the research model according to the following (Figure 1):

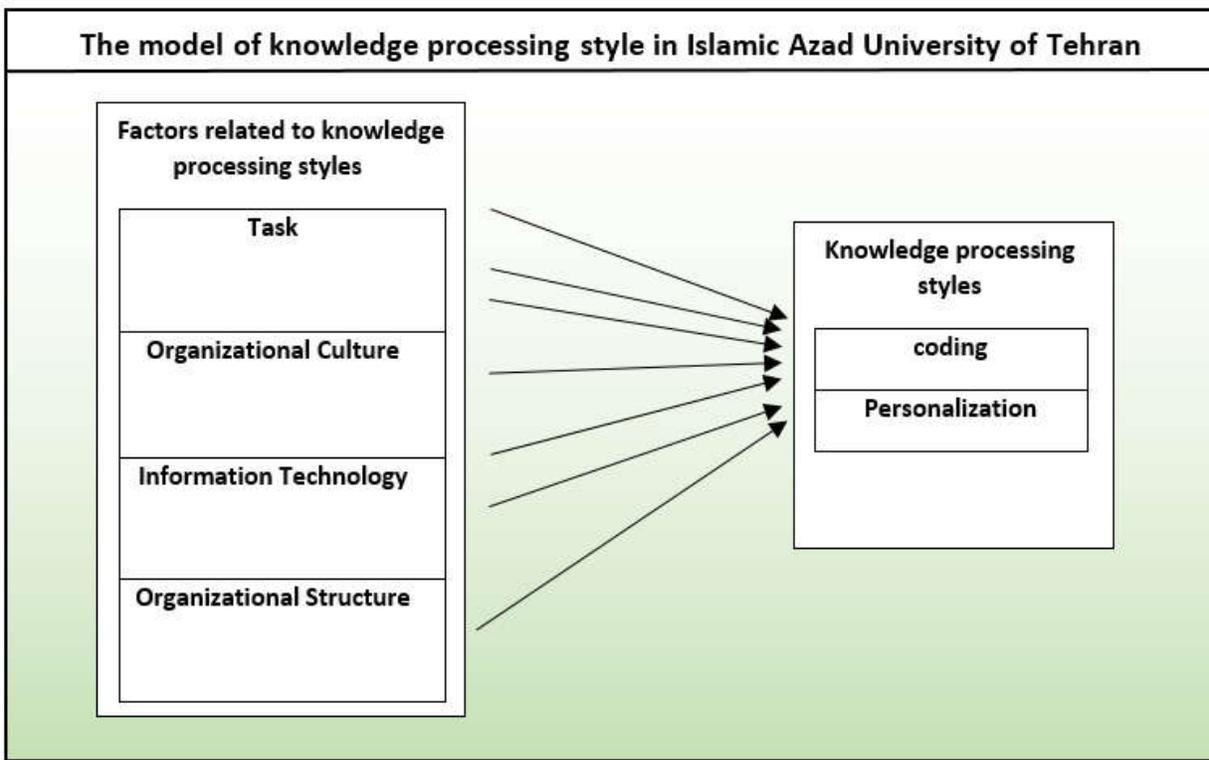


Figure 1. Conceptual model of research

The main question of the research is what processing style in the Islamic Azad University of Tehran? According to the model can be presented for the knowledge



above main question, the following sub-questions are also considered:

- 1- What are the factors related to knowledge processing styles in the study population?
- 2- What are the dimensions of knowledge processing styles in the studied population?
- 3- Is there a relationship between task and knowledge processing styles in the study population?
- 4- Is there a relationship between organizational culture and knowledge processing styles in the study population?
5. Is there a relationship between information technology and knowledge processing styles in the study population?
6. Is there a relationship between organizational structure and knowledge processing styles in the population?
- 7- What are the characteristics of the designed model in the studied population?

Research Methodology

This study is a developmental research in terms of purpose and a descriptive survey and correlation in terms of data collection. Also, a questionnaire was used to collect the data.

The statistical population of this research has consisted of two groups: the first group, the model design community, which includes subject knowledge experts and university professors in the field of knowledge management, the number of whom was 30 people and they have been selected by judging method. The second group is the managers and staff of the Islamic Azad University of Tehran. The number of them was 6,172, and the sample size using Cochran's formula was 301 and the random sampling method was simple.

The questionnaires used in this study, the dimensions, components and indicators of factors related to knowledge processing style and knowledge processing styles in the study population according to (Tables 3 and 4) are as follows:

Table 3. Identified components and indicators of factors related to knowledge processing styles

Dimensions	Components	Number of items (indicators)
task	Task diversity	1-3
	Task analysis	4-6
	Task dependency	7-9
Organizational Culture	Unity	10-12
	Independence	13-16
	Trust	17-22
Information Technology	IT support	23-27
Organizational Structure	Complexity	28-32
	Formality	33-36
	Concentration	37-39

Table 4. Identified components and indicators of knowledge processing styles

Dimensions	Components	Number of items (indicators)
Knowledge processing styles	Codification style	1-10
	Personalization style	11-17

Validity and reliability of data collection tools

Exploratory factor analysis (EFA) has been used to evaluate the validity of the measurement tool.

A: Identifying the components of factors related to knowledge processing styles (Table 5).

Table 5. Eigenvalue of each factor and cumulative frequency percentage of variance (after rotation)

Factor	cumulative frequency percentage of variance	percentage of variance	Eigenvalue
1	11.734	11.734	5.109
2	21.282	9.548	6.285
3	27.394	6.112	4.024
4	38.239	10.845	5.419

B) Identifying the components of knowledge processing styles (Table 6)

Table 6. Eigenvalue of each factor and cumulative frequency percentage of variance (after rotation)

Factor	cumulative frequency percentage of variance	percentage of variance	Eigenvalue
1	20.092	20.092	6.429
2	15.644	35.736	5.006

Cronbach's alpha coefficient was used to evaluate the reliability of the measurement tool in this study. To this aim, using the data obtained from the pretest in a sample of 27 members, Cronbach's alpha coefficient was

calculated, and the value of it was 0.87 for the study questionnaire, which shows the high reliability of the questionnaire. Cronbach's alpha values for the research



questionnaire and each of its constituent dimensions have been reported in (Table 7).

Table 7. Cronbach's alpha coefficient for evaluating the reliability of research factors

Row	Factors	Number of items	Cronbach's alpha coefficients
1	Factors related to knowledge processing styles	39	0.84
2	Knowledge processing styles	17	0.93
	The whole questionnaire	56	0.87

Findings obtained in this study

In this research, in order to identify the factors related to knowledge processing styles, dimensions of knowledge processing styles and finally designing the model, in addition to Delphi and exploratory factor analysis, confirmatory factor analysis has been used. The results obtained from all three methods indicate that the factors related to knowledge processing styles in Islamic Azad University are as follows: 1- Task 2- Organizational culture 3- Information technology 4- Organizational structure.

Question 1: What are the organizational factors related to knowledge processing style in Islamic Azad University?

According to the exploratory factor analysis as well as the confirmation and opinion of experts that was examined in the previous sections, organizational factors related to knowledge processing style in Islamic Azad University include: task, organizational culture, information technology and organizational structure (Table 8) and (Figure 2).

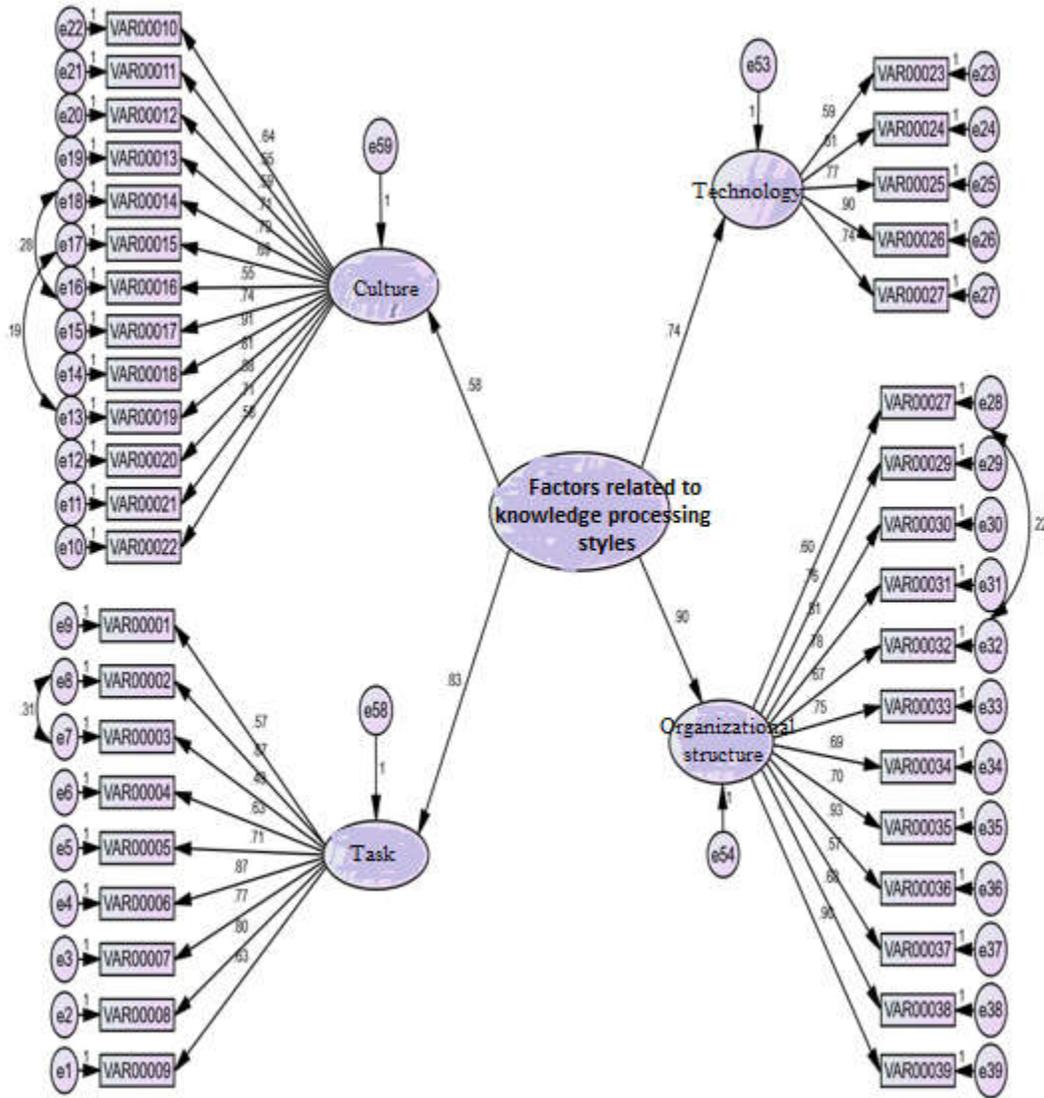


Figure 2. Diagram of organizational factors related to knowledge processing style



Table 8. Fit indicators of the variable path analysis model of factors related to the knowledge processing style

Indicator	Optimal limit of statistics	Reported amount
Root Mean Mean Power of Approximation Error (RMSEA)	≤ 0.08	0.52
Ratio ratio (χ^2 / df)	Less than 3	2.641
(GFI)	≥ 0.90	0.903
(AGFI)	≥ 0.90	0.955
Comparative Fitting (CFI)	≥ 0.90	0.937
Normaed fit (NFI)	≥ 0.90	0.927
(TLI)	≥ 0.90	0.931
Incremental Fitting (IFI)	≥ 0.90	0.920

Question 2: What are the dimensions of knowledge processing styles in Islamic Azad University?

According to the exploratory factor analysis as well as the confirmation and opinion of

experts that was examined in the previous sections, the dimensions of knowledge processing styles in Islamic Azad University are: codification style and personalization style(Figure 3).

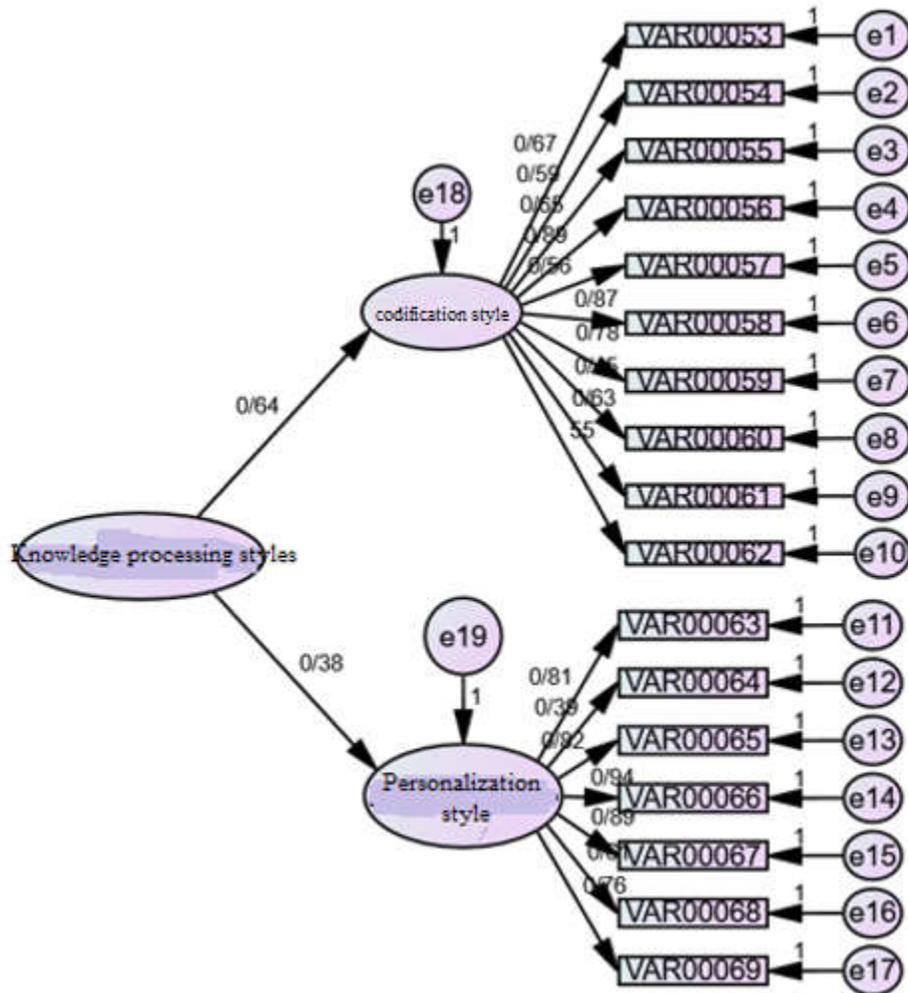


Figure 3. Diagram of dimensions of knowledge processing style

Question 3: What is the status of organizational factors related to knowledge processing styles in Islamic Azad University?

This variable is made up of 39 five-choice questions. The observed mean for this

variable in the study population is equal to (3.64), its median is equal to (3.32), its mode is (3), its standard deviation is (0.201), the minimum is (2.5) and the maximum is (4.01)(Table 9).



Table 9. Description of the variable of organizational factors related to knowledge processing style among the subjects

Variable	mean	median	mode	Standard deviation	Minimum	maximum
Organizational factors related to knowledge processing styles	3.64	3.32	3	0.201	2.5	4.01

To describe the status of research variables, mean, median and mode have been used, and to better interpret the mean, Bazargan

scoring scale, which is given in (Table 10), is used (Bazargan, 2000).

Table 10. Abbas Bazargan scoring scale

Very strong	strong	good	More than satisfactory	satisfactory	marginal	Non-satisfactory
4.51-4.99	4.01-4.49	3.61-3.99	3.01-3.59	2.51-2.99	2.01-2.49	Less than 2.00

Based on the "Barzargan" scale, it can be concluded that the variable of organizational factors related to processing style in the studies population has been studied at a good level.

Question 4: What is the status of knowledge processing style in Islamic Azad University?

This variable is made up of 17 questions with 5 options. The mean observed for knowledge processing style is equal to (3.27), its median is equal to (3.21), the mode is (3.48), standard deviation is (0.169), the minimum (2.18) and the maximum is (4.03) (Table 11).

Table 11. Describing the variable of knowledge processing style among the subjects

Variable	mean	median	mode	Standard deviation	Minimum	maximum
Knowledge processing style	3.27	3.21	3.48	0.169	2.18	4.03

To describe the status of research variables, mean, median and mode have been used and to better interpret the mean, "Bazargan"

scoring scale is used (Bazargan, 2000)(Table 12).

Table 12. Abbas Bazargan scoring scale

Very strong	strong	good	More than satisfactory	satisfactory	marginal	Non-satisfactory
4.51-4.99	4.01-4.49	3.61-3.99	3.01-3.59	2.51-2.99	2.01-2.49	Less than 2.00

Based on the "Bazargan" scale, it can be concluded that the processing style variable in the study population is at a level more than satisfactory.

Question 5. Is there a relationship between task and knowledge processing style in Islamic Azad University?

Table 13. Path coefficient and its significance and review of research hypotheses

The relationship under consideration	Pearson correlation coefficient	Path coefficient	t-value	p-value	Relationship type
Task→knowledge processing style	0.422	0.54	10.290	0.000	Additive

According to the value of correlation coefficient, calculated path coefficient, t value (greater than 1.96) and p value (less than 0.05), it can be concluded that there is a relationship between task and knowledge processing style in Islamic Azad University (Table 13).

Question 6. Is there a relationship between organizational culture and knowledge processing style in Islamic Azad University?

Table 14. Path coefficient and its significance and review of research hypotheses

The relationship under consideration	Pearson correlation coefficient	Path coefficient	t-value	p-value	Relationship type
Culture→ knowledge processing style	0.419	0.49	8.303	0.000	Additive

Considering the value of correlation coefficient, calculated path coefficient, t-value (greater than 1.96) and p-value (less than 0.05), can it be concluded that there is a relationship between culture and knowledge

processing style in Islamic Azad University? (Table 14).

Question 7. Is there a relationship between information technology and knowledge processing style in Islamic Azad University?



Table 15. Path coefficient and its significance and review of research hypotheses

The relationship under consideration	Pearson correlation coefficient	Path coefficient	t-value	p-value	Relationship type
Technology→ knowledge processing style	0.517	0.59	11.228	0.000	Additive

Considering the value of correlation coefficient, calculated path coefficient, t value (greater than 1.96) and p value (less than 0.05), can it be concluded that there is a relationship between technology and knowledge processing style in Islamic Azad University?(Table 15).

Question 8. Is there a relationship between organizational structure and knowledge processing style in Islamic Azad University?

Table 16. Path coefficient and its significance and review of research hypotheses

The relationship under consideration	Pearson correlation coefficient	Path coefficient	t-value	p-value	Relationship type
Technology→ knowledge processing style	0.598	0.68	12.043	0.000	Additive

According to the value of correlation coefficient, calculated path coefficient, t-value (greater than 1.96) and p-value (less than 0.05), it can be concluded that there is a relationship between the structure and style of knowledge processing in Islamic Azad University (Table 16).

Question 9. What are the characteristics of the designed model in the study population?

The designed model in the study population (Table 17) and (Figure 2).

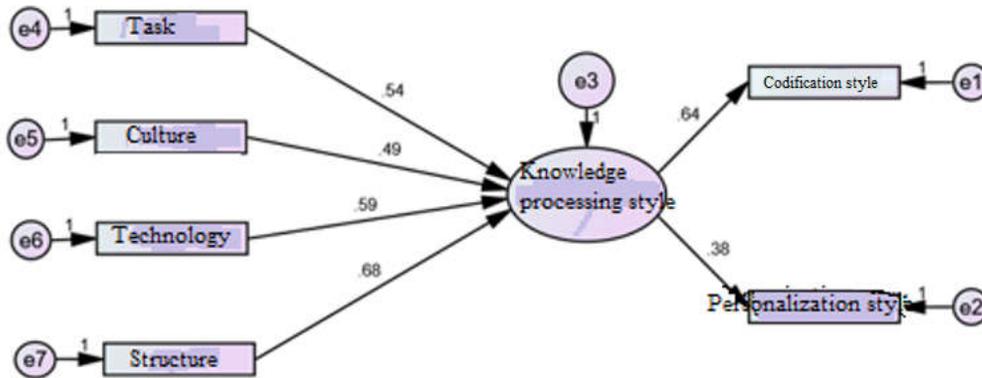


Figure 4. The Model of Structural Equations

Table 17. Indicators of structural equation model fit

Indicator	Optimal limit of statistics	Reported amount
Root Mean Mean Power of Approximation Error (RMSEA)	≤0.08	0.064
Ratio ratio (χ^2 / df)	Less than 3	2.480
(GFI)	≥0.90	0.938
(AGFI)	≥0.90	0.922
Comparative Fitting (CFI)	≥0.90	0.920
Normaed fit (NFI)	≥0.90	0.945
(TLI)	≥0.90	0.908
Incremental Fitting (IFI)	≥0.90	0.936

Conclusion

The subject of this research is to explain and design a model of knowledge processing style in Islamic Azad University of Tehran. For this purpose, in order to identify the factors related to knowledge processing styles, dimensions of knowledge processing styles and finally model design, in addition to reviewing previous research studies, three Delphi methods, exploratory factor analysis and confirmatory factor analysis have been used. The results of these three methods

display that task, organizational culture, information technology, organizational structure are factors related to knowledge processing styles in Islamic Azad University. Also, according to the results of the three methods mentioned, it was found that codification style and personalization style are the dimensions of knowledge processing style in Islamic Azad University. These results represent that there is a relationship between the mentioned factors and knowledge processing styles in the Islamic Azad University of Tehran and the



existence of a relationship between them is consistent with most previous studies. The relationship between task and knowledge processing styles is consistent with Sung (2008) and general research (2006), the relationship between organizational culture with knowledge processing style with (Venkitachalam & Willmott, 2016), (Song, 2008), and one of the components of culture Organizational (trust) is consistent with the research done by (Jasimuddin et al. 2008). The factor of technology is consistent with the research of (Venkitachalam & Willmott, 2016), the research done by (Song, 2008), the research done by (Jasimuddin et al. 2008), as well as the general research (2006). The relationship between organizational structure factor and knowledge processing styles is consistent with the research of (Venkitachalam & Willmott, 2016) and the research done by (Jasimuddin et al. 2008), The relationship between each of these factors and knowledge processing styles can be analyzed as follows:

1. Task: The type of task, different organizations and even different units of an organization perform is different from other organizations or units. For example, the task of some of them is simple, routine and repetitive, while the task of others is high and non-repetitive. It is not possible to use a specific style for knowledge processing for both groups. The organization or unit that deals with simple and repetitive tasks should mostly choose a coding style, and contrastingly, the organization or unit with various and non-repetitive tasks should use

personalization style to process its knowledge.

2- Organizational culture; Another important and influential factor on knowledge processing style is organizational culture. Since the governing space of an organization is different from another organization and even a unit from another unit is different, the way knowledge is processed will also be different. For example, in an organization or unit where the correlation of people is high and people trust each other, using personalization style to exchange knowledge in the organization will be very effective, and contrastingly, in an organization where people want to be more independent and there is less trust between them, the use of personalization method will not be effective because personalization style occurs mostly through dialogue, interaction and face-to-face method, which is not possible in an atmosphere of mistrust and lack of solidarity.

3- Information Technology: As mentioned, almost all research studies conducted on knowledge processing styles agree on the impact of information technology on knowledge processing style. This is quite obvious because information technology is a vital factor for using any of the knowledge processing styles, especially the coding style. In previous discussions, it was pointed out that in the coding style, knowledge is obtained from its owners, and stored and recorded in the database for being reused, and individuals retrieve and use the coded knowledge that is previously recorded in the database, electronic repositories, manuscripts without having a contact with

the knowledge owners. It is clear that this would not have been possible without the use of information technology.

4- Organizational Structure: As previous research studies as well as expert opinions represent, complexity, formality and concentration, which are components of organizational structure, affect on the choice of knowledge processing style. In an organization or unit in which the formality is high and the rules and regulations are strictly followed, people do not have much freedom of action and cannot have informal communication with each other or there is little informal communication between them. In such conditions, the possibility of using a very personalized coding style is very low because in face-to-face interaction, informal communication is one of the principles of knowledge personalization style. Or it is very clear that consolidated organizations have less belief in employee participation in decision making and the personalization style cannot be used in this organization and the coding style is appropriate for such organizations.

In addition to identifying the factors associated with knowledge processing styles, identifying the dimensions of knowledge processing styles is also important. Therefore, by reviewing previous research studies and using three methods of Delphi, exploratory analysis and factor analysis, the dimensions of knowledge processing styles have been identified. The results obtained on the dimensions of knowledge processing style in this study are consistent with the studies conducted by

(Venkitachalam & Willmott, 2016), (Song, 2008), (Jasimuddin et al. 2008).

Research suggestions

1. Considering that task is one of the important and influential factors on knowledge processing style, it is suggested that public universities and Islamic Azad University of Tehran to consider the nature of the task of individuals or units to select the suitable style for knowledge processing. For instance, a unit that has diverse, non-repetitive, and highly dependent tasks must use a personalization style, while a unit that has routine, repetitive, analytical, and low-diversity tasks must use a coding style.
2. Considering that organizational culture is one of the most significant factors affecting the style of knowledge processing, it is suggested that universities pay more attention to creating a culture of trust, solidarity, cooperation and participation among faculty members, managers and staff. Implementing well-developed cultural programs and developing an organizational charter that incorporates the fundamental values of trust and participation can be influential.
3. It is suggested that universities hold trust-building training courses among faculty members with a motivational mechanism and advance ideas by creating an atmosphere of participation and interaction.
4. Considering that organizational structure is one of the main determinants of knowledge processing style, it is suggested that universities that have a strict organizational structure, high formality and



high complexity, to design a flexible structure that provides appropriate communication and interaction between people and organizational groups as soon as possible. Because traditional hierarchical structures, although they allow the transfer of knowledge through the chain of command, they prevent the transfer of knowledge between organizational units at the horizontal level of the organization.

5. It is suggested that a committee comprising of educational and research knowledge owners (faculty members) and executive knowledge owners (managers and staff) be formed to model knowledge processing in universities and that the committee's views be encompassed in strategic planning.

Suggestions for future researchers

1- Designing and explaining a coordination pattern of knowledge processing styles or the tasks of individuals and units in the organization

2- Designing and explaining a suitable structure model with knowledge processing styles

3- Designing and explaining a trust-building model in universities and higher education centers-

4-Examining the structural barriers to building trust among faculty members as well as among managers and university staff

5- Designing and explaining the model of knowledge processing style in other universities and higher education centers

Limitations of research

No study or research is without limitations. There are some limitations in this study as well, some of which are mentioned below:

1. Combining and merging models with each other is a very delicate task. Given that other models designed in the field of knowledge processing style in the world have been used to design the model of this research, combining these models and designing a fully integrated model that provides a unified framework for knowledge processing style in organizations, was accompanied by some problems.

2. Models used in various industrial, commercial and educational organizations having different conditions, were implemented. Designing and adapting them to the conditions of a scientific and educational organization was accompanied by some difficulties.

3. Due to the novelty of the subject of knowledge processing styles, and the insufficient familiarity of the questionnaire completers, especially the questionnaire of managers and staff, the researcher's work was hard.

4. Considering that the research and models used were all extracted from foreign sources, it was a bit difficult to localize these models and adapt them to the conditions of our society.

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