Relationship between Knowledge Management and Managerial Skills: The Role of Creative Thinking

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Abstract

Knowledge management is one of the most important issues that must be considered by the managers of organizations, especially educational organizations. It is aimed at finding new viewpoints about learning, creating knowledge, and developing internal and external competences. This paper investigates the relationship between managerial skills and knowledge management mediated by creative thinking. The analysis is based on a survey of several hundred managers and teachers of Isfahan secondary schools. The research employs a step-by-step regression analysis and structural equation modeling.

Based on the results of the calculations, a significant correlation was established between the three main variables of the study: managerial skills, knowledge management, and creative thinking. Thus, the hypotheses on the close relationship between these factors were confirmed. The quality of knowledge management is affected primarily by social skills and the ability to enforce creative thinking in daily life. The findings suggest the need for establishing an organizational environment that fosters the development of knowledge management skills and removes barriers impeding this process.

Keywords: knowledge management; creative thinking; management skills; technical skills; social skills; cognitive skills; education.

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Educational institutions play a critical and tangible role in the molding and development of society. In order to achieve the cultural, social, and economic goals set before them, these institutions must develop their resource base, including the training of teachers and competent managers. In this sense, for the realization of such purposes, attractive environments must be created and reinforced by competent managers and staff.

One of the most important issues faced by the manager of any organization, of especially educational organizations, is knowledge management. One must note that the availability of swathes of knowledge can only be considered beneficial if it is considered a dynamic asset, which allows for building up organizational capacities and expanding opportunities for development [*French, Bill,* 2013].

As mentioned by [*Smith,* 2004; *Shaker,* 2007; *Hafez, Alghatas,* 2007], the purposes of knowledge management include finding new viewpoints about learning, creating knowledge, and developing internal and external competences. This can be better fulfilled if a manager has a set of certain skills and improves these skills continuously until he/she can engage with topics related to knowledge management at his/her organization. From the viewpoint of Robert Katz [*Katz,* 1974], management skills can be separated into three categories: cognitive, social, and technical.

Technical skills involve the possession of knowledge, special methods and operational procedures, and competence in analyzing specialized subjects [*Rezaiean,* 2003]. Social skills involve being able to work with, understand, and motivate an individual or a group [*Alagheband,* 2005]. Finally, cognitive skills involve abstract thinking, the ability to look at the big picture as well as see relationships within an organization and its outside environment [*Robbins,* 2010].

The main component of an organization's knowledge lies within its staff's minds. This organizational asset includes their skills, abilities, and practical experience, which is acquired through study and work. Now, questions arise such as, for example, 'How are these skills, abilities, and practical experiences transferred from one source to another?'; 'Can we use knowledge management to prevent the loss of this asset?'

According to Buzan, creative thinking is the ability to look at a problem from a new angle, to rethink one's position on one issue or another [*Buzan,* 2003]. It is the process of breaking down and building up our knowledge about an issue while gaining new insights about it. The theoretical model of our research is presented in Figure 1.

According to the theoretical model of research, knowledge management is the dependent variable, the management skills are the independent variable (including cognitive, social, and technical skills), while creative thinking acts as a mediator. To investigate management skills, knowledge management, and creative thinking, this study relies upon the approaches presented in [*Katz,* 1974; *Nonaka, Takeuchi,* 1995; *Torrance,* 1980], respectively.

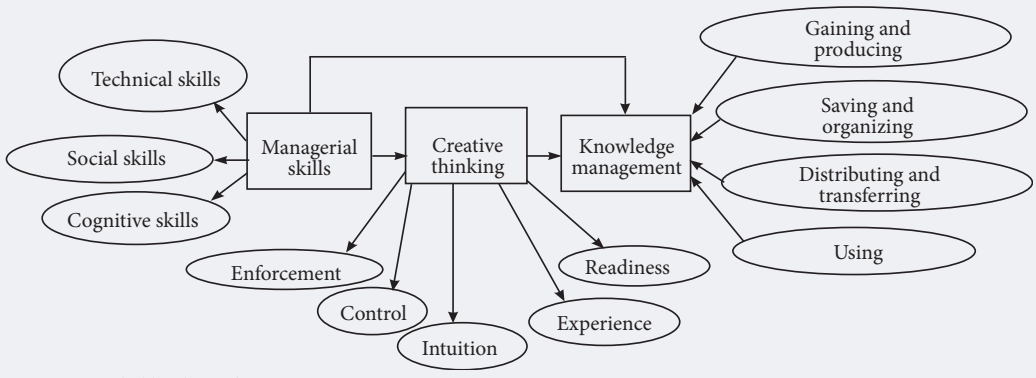
Literature Review and Hypotheses Formulation

By investigating creative thinking styles, Hara and Stranberge [*Hara, Stranberge,* 2009] concluded that the observed subjects who employ original ways of thinking had better creative function. El Sabaa [*El Sabaa,* 2011] posits that among the various management skills, social skills have the greatest impact upon one's managerial approach when compared with technical and cognitive skills.

Wiig [*Wiig,* 2000] performed a comprehensive study on knowledge management at public organizations and claimed that systematic knowledge management was an important problem-solving tool. Such a system raises an organization's effectiveness in resolving economic and social problems.

Che Rusuli et al. [*Che Rusuli et al.,* 2013] conducted a related study entitled "Linkage Between Knowledge Management Practices Towards Library User's Satisfaction at Malaysian University Libraries", and the results indicated that there was a strong relationship between knowledge management function and library users' satisfaction. By registering data and preserving knowledge, the internal services of the library improved and costs fell. The improvement of information technology stations facilitated knowledge management deployment at university libraries and increased users' satisfaction.

Figure 1. **Theoretical Model of Research**



Source: compiled by the author.

Khodayari [*Khodayari,* 2006] conducted a study on boys' secondary schools in Tehran, which showed that those administrators with better creative thinking skills could more successfully resolve educational and training issues. In another study on Iranian universities, the relationship between employees' cognitive, social, and technical skills and achieved results was analyzed by Afshari, Honary, and Ghafori [*Afshari et al.,* 2013]. According to the management reserve (MR) index, highest priority was given to social skills, which are necessary for all types of administrative tasks (highest MR value), then cognitive and technical skills follow, respectively. Ghazizade and Atayee [*Ghazizade, Atayee,* 2013] design an effective path for an organization through the process of knowledge management. The results demonstrated that a key aspect of knowledge management involves transforming technical knowledge into explicit knowledge based on practical experience. Furthermore, this leads to higher levels of effectiveness at organizations. This study delves into methods of knowledge identification and the exploitation of such knowledge by analyzing the needs, tools, and methods of knowledge acquisition. Ameri and Areze [*Ameri, Areze,* 2014] studied the relationship between knowledge management and the communication skills of managers at Iranian sports schools. The results of this research showed that there is a significant and positive relationship between communication skill indices and the creation and transfer aspects of knowledge management; therefore, managers must improve their communication skills until this leads to the increased creativity of personnel and improved development of the organization, including more effective knowledge management skills.

In a similar study by Farahi [*Farahi,* 2014], the author surveyed the relationship between skills and job performance in management roles among scientific council members of NAJA (Islamic Republic of Iran Police). The study shows that the acquisition of necessary skills qualitatively depends upon employees meeting their professional obligations, the absence of this negatively impacts one's career.

According to the aforementioned studies, we may conclude that, in managers' view, social skills (teamwork, the ability to understand and motivate others), technical skills (introducing feedback, organizing and coordinating work, computer skills), and communication skills (rhetoric, showing emotion and cooperation with others) play a great role that one's position and job description. Managers possessing the essential managerial skills enjoy greater motivation and satisfaction, and perform more effectively. For example, those managers who are familiar with information technology and computers, more rapidly and effectively solve problems connected with information and data collection.

The purpose of this study is to investigate the relationship between managerial skills and knowledge management mediated by creative thinking. Accordingly, the following hypotheses have been drawn:

1) There is a significant relationship between managerial skills and knowledge management.
2) There is a significant relationship between creative thinking and knowledge management.
3) There is a significant relationship between managerial skills and creative thinking.
4) The improvement of knowledge management processes depends upon managerial skills.
5) The improvement of knowledge management depends upon creative thinking.
6) Managerial skills facilitate the development of creative thinking.
7) The proposed conceptual model can be applied in practice.

Methodology

In this article, the author employs an applied approach, which describes the situation and analyzes relationships between the dependent and independent variables. In this research, knowledge management acts as the dependent variable and management skills are the independent variable. Meanwhile, managers' creative thinking acts as a mediator between the dependent and independent variables. The author then considers the mediation role played by creative thinking using structural equation modeling and a step-by-step regression analysis.

In this research, the sample includes managers and teachers from Isfahan school districts in 2015–2016, whose numbers amount to 377 and 5,981, respectively. The sampling method is random and proportionate to the sample size of managers and teachers and is calculated according to Cochran's sample size formula [*Cochran,* 1977] as the following (see parameter details in Table 1):

$$n = \frac{Nt^2pq}{Nd^2 + t^2pq}.$$

Table 1. **Parameters for Determining Sample Size**

Parameters	Code	Managers	Teachers
Sample size	n	185	360
Population	N	377	5981
Acceptable confidence level	t	1.96	1.96
Share in total sample, which possesses the studied characteristics	p	0.5	0.5
Share from total population with none of the studied attributes	q	0.5	0.5
Desirable probable accuracy or confidence interval	d	0.05	0.05

Source: compiled by the author.

Table 2. **Average Value and Standard Deviation for Scores of Knowledge Management, Creative Thinking, and Management Skills**

Statistical indices for variables	Mean	Standard deviation
Knowledge management	0.63	4.05
Creative thinking	0.45	3.94
Management skills	0.50	4.38

Source: compiled by the author.

Table 3. **The Correlation Coefficient between Management Skills and Knowledge Management**

Statistical index	r	r^2	Sig.
Management skills	0.84	0.71	0.001
Technical skills	0.77	0.59	0.001
Social skills	0.81	0.65	0.001
Cognitive skills	0.79	0.63	0.001

Notes: r — correlation coefficient; r^2 — correlation coefficient square; Sig. — significance level. p<0.05

Source: compiled by the author.

Table 4. **The Correlation Coefficient between Creative Thinking and Knowledge Management**

Statistical index	r	r^2	Sig.
Creative thinking	0.32	0.10	0.001
Readiness	0.21	0.04	0.010
Experience	0.27	0.07	0.001
Intuition	0.18	0.03	0.032
Control	0.25	0.06	0.002
Enforcement	0.28	0.08	0.001

Notes: r — correlation coefficient; r^2 — correlation coefficient square; Sig. — significance level. p<0.05

Source: compiled by the author..

Table 5. **The Correlation Coefficient between Management Skills and Creative Thinking**

Statistical index	r	r^2	Sig.
Management skills	0.30	0.09	0.001
Technical skills	0.33	0.11	0.001
Social skills	0.28	0.07	0.001
Cognitive skills	0.23	0.05	0.001

Notes: r — correlation coefficient; r^2 — correlation coefficient square; Sig. — significance level. p<0.05

Source: compiled by the author.

According to the calculations produced by the aforementioned formula, 185 managers and 370 teachers were selected as a statistical sample.

For investigating management skills, Robert Katz' theory-based, established questionnaire was used [*Katz,* 1974]. This questionnaire includes 36 questions on the Likert five-step scale whose reliability coefficient was calculated at 0.97 by using Cronbach's Alpha coefficient.

For investigating knowledge management, a questionnaire based on Takeuchi and Nonaka's model [*Nonaka, Takeuchi,* 1995] was used. This questionnaire includes 37 questions on the Likert five-step scale, and its reliability coefficient was calculated at 0.97 by using Cronbach's Alpha coefficient. Teachers from the sample served as respondents.

For the creative thinking variable, a standard questionnaire based on Torrance's theory [*Torrance,* 1980] was employed. It includes 20 questions, and its reliability coefficient is 0.88.

These questionnaires were given to consultants and experts for revisions, in order make them more relevant. To calculate the reliability of the questionnaires, Cronbach's alpha coefficient was used. Education experts from universities underscored the validity of the three questionnaires.

One-hundred-eighty-five questionnaires relevant to creative thinking were distributed among the sample of managers who responded to 174, which were used in this analysis. For both management skills and knowledge management, 370 questionnaires were distributed among the sample of teachers. Of these, 360 questionnaires were answered and used in the analysis.

Results

The results of the descriptive statistics analysis showed that the highest percentage of responses were given by managers between 46 and 55 years of age with 20 years' experience in the humanities and a BA/BS degree, while the majority of teachers were between 36 to 45 years of age with the relevant experience and degree. Table 2 shows the main indices for the three variables of this study.

Deductive Statistics

In this section, the deductive findings of this research confirm or refute the proposed hypotheses.

Table 3 shows that the correlation coefficient between management skills and knowledge management is significant (r=0.84). On the basis of the determination coefficient (r^2), variance between management skills and knowledge management amounts to 71.2%, so *Hypothesis 1,* which states that there is a relationship between management skills and knowledge management is confirmed.

The findings of Table 4 show that the correlation coefficient between creative thinking and knowledge management is significant (r=0.328).

Table 6. **Coefficients from Multiple Regression of Certain Components of Management Skills and Knowledge Management (p<0.01)**

Criterion – Knowledge management	Statistical indexes					
	Independent variable	Multiple regression coefficient	Multiple regression coefficient squared	Adjusted multiple regression coefficient squared	F-Coefficient	Significance level
Step 1	Social skills	0.81	0.65	0.65	245.37	0.001
Step 2	Social skills Technical skills	0.83	0.69	0.69	145.29	0.001
Step 3	Social skills Technical skills Cognitive skills	0.84	0.71	0.70	103.75	0.001

Source: compiled by the author.

Table 7. **Table of the β-coefficient as an Indicator of the Correlation between Certain Dimensions of Management Skills and Knowledge Management (p<0.05)**

Criterion – Knowledge management	Statistical indexes					
	Independent variable	Non-standard β coefficients		Standard β coefficients	t-coefficient	Significance level
		β	Standard error			
Step 1	(Constant)	0.26	0.24	—	0.08	0.282
	Social skills	0.87	0.05	0.81	15.66	0.001
Step 2	(Constant)	–0.34	0.27	—	–1.25	0.210
	Social skills	0.57	0.09	0.53	6.25	0.001
	Technical skills	0.44	0.11	0.34	4.01	0.001
Step 3	(Constant)	–0.48	0.27	—	–1.76	0.079
	Social skills	0.36	0.11	0.33	3.03	0.003
	Technical skills	0.34	0.11	0.26	2.97	0.003
	Cognitive skills	0.34	0.12	0.29	2.64	0.009

Source: compiled by the author.

Table 8. **Multiple Regression Coefficient of Creative Thinking Dimensions with Knowledge Management (p<0.05)**

Criterion – Knowledge management	Statistical indexes					
	Independent variable	Multiple regression coefficient	Multiple regression coefficient squared	Adjusted multiple regression coefficient squared	F-coefficient	Significance level
Step 1	Enforcement	0.31	0.09	0.09	14.81	0.001

Source: compiled by the author.

Table 9. **Variable from Regression Equation for Anticipating Knowledge Management with Creative Thinking Dimensions (p<0.05)**

Criterion	β	T-statistics	Significance level
Readiness	0.08	0.94	0.346
Experience	0.015	1.56	0.120
Intuition	0.04	0.46	0.641
Control	0.11	1.11	0.267

Note: Analysis is taken in one step.
Criterion - knowledge management

Source: compiled by the author.

Table 10. **The β-coefficient as an Indicator of the Correlation between Creative Thinking and Knowledge Management (p<0.05)**

Statistical indexes					
Independent variable	Non – standard β-coefficient		Standard β-coefficient	t-coefficient	Significance level
	Standard error	β			
(Constant)	0.30	2.90	—	9.45	0.001
Enforcement	0.30	0.07	0.31	3.84	0.001

Note: Analysis is taken in one step. Criterion - creative thinking
Source: compiled by the author.

On the basis of the determination coefficient (r^2), the variance of creative thinking and knowledge management is 4.7%. So, *Hypothesis 2,* which states that there is a relationship between creative thinking and knowledge management is confirmed as well.

The findings of Table 5 show that the correlation coefficient between creative thinking and management skills is significant (r=0.308). Based on the determination coefficient (r^2), variance between creative thinking and management skills is 9.5%. Therefore, *Hypothesis 3* is confirmed.

Furthermore, Table 6 shows that social skills, technical skills, and cognitive skills are the best anticipators of knowledge management, respectively. Based on the results of a step-by-step regression analysis, the relationship between social, technical, and cognitive skills and knowledge management is significant. Therefore, on the basis of the coefficients characterizing social skills in particular and those with account of social, technical, and cognitive skills together determines 69.6% and 71.2%, respectively, of the variance in knowledge management. The size of the F-coefficient is significant at p<0.01, therefore, the regression can be used on the total sample.

The findings of Table 7 show that the β coefficient increases knowledge management to 0.337 in lieu of a one-unit increase in social skills and the β coefficient increases knowledge management to 0.292 in lieu of a one-unit increase in technical skills.

The forecast 'equation' for the *fourth hypothesis* in this research is introduced as follows:

Knowledge management= (-0.489) + social skills (0.362) +technical skills (0.340) + cognitive skills (0.341)

As the findings of Table 8 show, the best anticipator of knowledge management studied in the first step of the regression is enforcement. Based on the step-by-step regression analysis results, the relationship between enforcement and knowledge management is significant. Therefore, the coefficient of enforcement is characterized by 9.8% variance in knowledge management. The F-coefficient observed at the p<0.01 level is significant, so the regression can be used on the entire sample.

According to Table 9, the relationship between readiness, experience, intuition, and control is not significant.

The findings of Table 10 show that the β coefficient increases knowledge management up to 0.312 in lieu of a one-unit increase in enforcement.

The forecast equation of *hypothesis 5* is as follows:

Knowledge management = (2.900) + enforcement (0.300)

According to the findings of Table 11, the best anticipators of creative thinking are technical skills. Based on the step-by-step regression analysis, the relationship between technical skills and creative thinking is significant. So, technical skills specifies 10.5% variance in creative thinking. The F-coefficient with a value of p<0.01 is significant, therefore, the regression is applied to the general sample.

According to Table 12, the relationship between cognitive and social skills and creative thinking is not significant.

According to the findings of Table 13, the β coefficient increases creative thinking to 0.325 in lieu of a one-unit increase in technical skills.

The forecast equation of *Hypothesis 6* is as follows:

Creative thinking = (2.592) + technical skills (0.311)

Finally, we check *Hypothesis 7* on the practical applicability of the model, assessing it based on goodness-of-fit.

To answer this question, chi-square statistics and other criteria relevant to the adaptability of the model in practice must be considered. All indices for goodness-of-fit are presented (see Tables 14 and 15).

T value

With the help of T criteria, the significance of model parameters is assessed. This statistic is obtained by calculating ratio of the parameter coefficient and standard deviation.

Table 11. **Multiple Regression Coefficients of Management Skills and Creative Thinking (p<0.05)**

Statistical indexes					
Independent variable	Multiple regression coefficient	Multiple regression coefficient squared	Adjusted multiple regression coefficient squared	F-coefficient	Significance level
Technical skills	0.32	0.10	0.10	17.80	0.001

Source: compiled by the author.

Table 12. **Regression Variables Describing the Correlation between Creative Thinking and Management Skills (p<0.05)**

Criterion	β	T-statistics	Significance level
Social skills	0.144	1.084	0.280
Cognitive skills	–0.077	–0.582	0.562

Note: Analysis is taken in one step. Criterion - creative thinking
Source: compiled by the author.

Table 13. **The β-coefficient as an Indicator of the Correlation between Management Skills and Creative Thinking (p<0.05)**

Dependent variable — creative thinking	Statistical indexes					
	Independent variable	Non-standard β-coefficient		Standard β-coefficient	t-coefficient	Significance level
		Standard error	β			
Step 1	(Constant)	2.59	0.32	—	8.01	0.001
	Enforcement	0.31	0.07	0.32	4.21	0.001

Source: compiled by the author.

$$Z \text{ or } T = \frac{parameter\ coefficient}{parameter\ standard\ deviation}.$$

To achieve statistical significance, this figure must be higher than 2 in the T test and higher than 1.96 in the Z test and/or less than -1.96. The estimated T value is higher than 2 and/or less than -2 for all variables. Therefore, all estimates are statistically significant. This model not only has goodness-of-fit, but all coefficients of the model are significant.

With regard to all processes completed in order to introduce a model (Figure 2), the following implicit model confirms the effect of management skills on knowledge management mediated by creative thinking. On the subject of the indirect effect of management skills on knowledge management (the path of management skills through creative thinking), path coefficients are multiplied by each other. The effect of management skills on knowledge management is significant, that is, the T value of each path is higher than 1.96, which indicates the effect of management skills on knowledge management mediated by creative thinking.

Discussion and Conclusion

The purpose of this research was to analyze the three components of management skills and the knowledge management process mediated by creative thinking. The results of the descriptive analysis showed that, in the sample of managers, the highest number are between 46 and 55 years of age, with 20 years of service or more in the humanities and a BA/BS degree, while the sample of teachers are mostly between 36 and 45 years of age, with 20 years' experience or more in the humanities and a BA/BS degree. The results of the deductive analysis showed that there is a significant relationship between knowledge management and management skills (r=0.844), and the best anticipator of knowledge management is primarily one's social skills, while technical and cognitive skills follow. Based on the results of a step-by-step regression analysis, the relationship between cognitive, technical and social skills and knowledge management is found to be significant (first and fourth hypotheses). There is a positive and significant relationship (r=0.327) between creative thinking and knowledge management. The best anticipator of knowledge management primarily is enforcement. Based on the step-by-step regression analysis results, the relationship between enforcement and knowledge management is significant, and the relationship of readiness, experience, intuition, and control with knowledge management is not significant (second and fifth hypotheses). The correlation coefficient between creative thinking and management skills is significant. Among the investigated variables in the regression, the second-best predictor after technical skills was creative thinking and based on the step–by–step regression analysis, the relationship between technical skills and creative thinking was significant, but the relationship between cognitive and social skills on the one hand and creative thinking on the other was not significant (third and sixth hypotheses). After analyzing the collected data, the results confirmed the effect of management skills on knowledge management mediated by creative thinking; therefore, the implicit model has goodness-of-fit.

Due to the obtained results of the current study, the strongest relationship was observed between management skills and knowledge management. Therefore, it seems essential that managers of educational

Table 14. **Indices of Model Adaptability**

Name of index	Standard value of index	Index value in given model	Conclusion
dF to chi2 ratio	—	49.97	It has goodness of fit
P value	> 0.05	0.346	It has goodness of fit
G F I	> 0.9	1	It has goodness of fit
A G F I	> 0.9	1	It has goodness of fit
N F I	> 0.9	0.98	It has goodness of fit
C F I	> 0.9	1	It has goodness of fit
R M S E A	< 0.1	0.019	It has goodness of fit

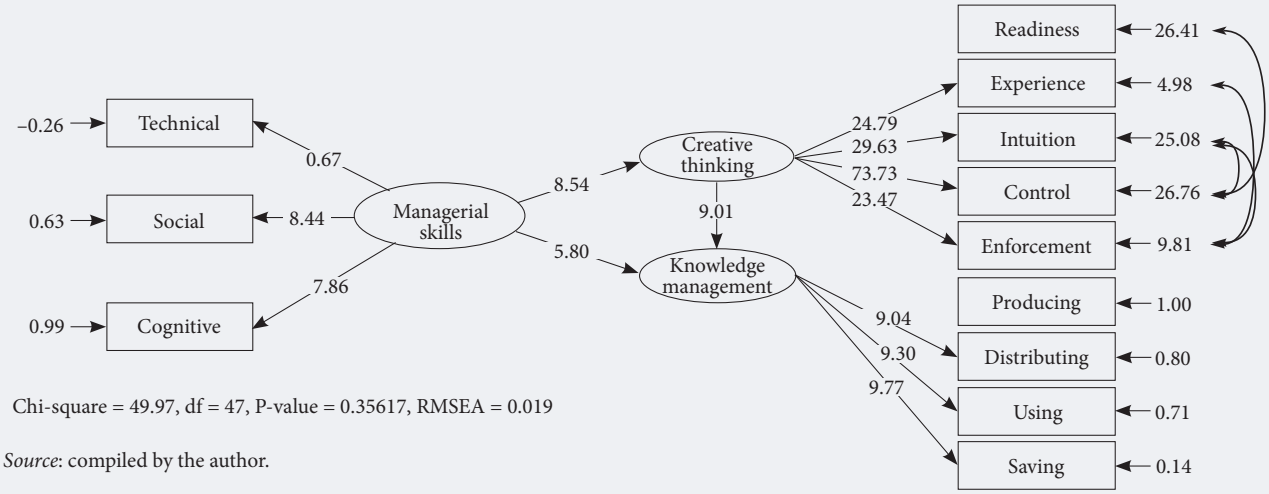
Source: compiled by the author.

Table 15. **Direct Effects of Management Skills on Knowledge Management**

Survey of effect	Effect coefficient	Statistical value of T	Conclusion
Management skill-creative thinking	0.30	8.54	Management skills affect creative thinking
Management skills-knowledge management	0.26	5.80	Management skills affect knowledge management
Creative thinking-knowledge management	0.33	9.0	Creative thinking affects knowledge management

Source: compiled by the author.

Figure 2. **Adjusted T-Index Model**



Source: compiled by the author.

organizations pay attention to this fact, and that managers possess some skills to employ knowledge management and the advantages of those processes by constantly encouraging the development of those skills at their organizations. Also, the senior directors of organizations must provide an essential and appropriate infrastructure for developing managers' skills by holding training courses and making the basic arrangements. Furthermore, they should try to remove barriers impeding the implementation of knowledge management processes at their schools and organizations.

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