Investigating the Role of Knowledge Management in Increasing the Creativity of Personnel in West Azerbijan Water and Sewage Organization

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ABSTRACT

The present study is an attempt to investigate the effects of knowledge management in increasing the creativity of the employees who worked in west Azerbijan Water and Sewage Organization (WSO) in 2012. Knowledge management constitutes the creation, storage, sharing and application of knowledge. The population of the study included 211 clerks and managers from among whom 136 individuals were selected using Krejcie and Morgan table and random sampling classification method. The data was collected using questionnaires with closed questions. The reliability of knowledge management questionnaire was estimated 0.80 and creativity questionnaire was estimated 0.90, using Cronbach α. The content validity of the questionnaires was confirmed by the university professors and experts. SPSS version 19 was used for data analysis (Pearson correlation coefficient and multivariable regression analysis). The results of the study show a significant relationship between the application of knowledge management and increasing the creativity of WSO personnel. All the minor assumptions of the study were validated as well. In other words, the results show that there is a meaningful relationship between knowledge management dimensions and increasing WSO personnel's creativity. Furthermore, the results of multivariable regression analysis show that the proposed model is statistically meaningful.

KEYWORDS: knowledge management, knowledge creation, knowledge storage, knowledge sharing, knowledge application, organizational creativity
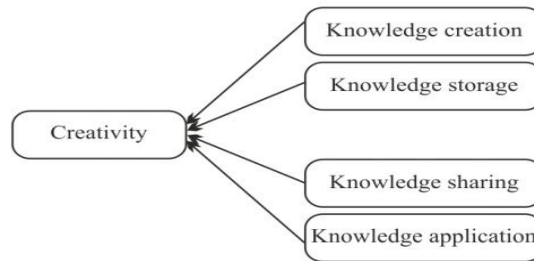
INTRODUCTION

Nowadays knowledge and technology play a key role in developing every society worldwide and we are approaching knowledge-oriented era. The sustained development is based on knowledge and technology. The development of technology in turn is based on creativity and innovation in science for which research is a prerequisite. Apparently, the societies in which the priority is given to research and ample facilities are provided to carry it out are able to produce more and more knowledge. They are successful in such spheres as politics, programming, decision-making and economical activities. Thus, making progress in science and the innovation and power obtained by knowledge production, implication and distribution leads to the development of society. The societies that are able to manage and use knowledge properly would enjoy prosperous future [1]. Producing science, acquiring it from outer sources, using it for decision-making, applying it in the processes, manufactures and/or services facilitates its growth. Creating connection between science and other parts of organization, the evaluation of knowledge sources of organization and estimating the effects of knowledge management (hereafter KM) are among the activities that are necessary to pave the path for learning and creativity in organization [2]. The importance of KM is known for everybody. However, it seems that only a few organizations are able to make use of it. An overwhelming KM projects fail because its application is not an easy task [3].

The current age is called the evolution and development era. Science grows so fast that every 2.5 years it develops two times and today's findings become out- of –date by 4 years. Taking into consideration these facts, knowledge is an invaluable source and a capital that needs to be managed. Moreover, world competitive marketing adds to the significance of KM in organization as a competitive privilege in knowledge-oriented economy [4]. Gotcha (1999) states that the business model of KM is a middle course with all dimensions of knowledge (i.e., knowledge creation, coding and sharing, and the investigation of how they improve learning and increase creativity) [5].

The current study is of descriptive type that aims to investigate the effects of KM implication in increasing the creativity of employees. Thus, the following conceptual model will be explored in this study.

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Fig.1: Conceptual framework

In this model KM is independent variable and creativity is the dependent variable. According to Jashpara's model the four dimensions of KM are; knowledge creation, storage, sharing and application [6]. Jashpara's model was used in this study to find out the relationship among these variables and creativity.

METHODS AND MATERIALS

This study is an applied one and the used methodology is of correlation type which is a sub category of field and library study. The population comprises 211 managers and clerks who work in the head quarter of WSO located in Oromia, west Azerbijan, Iran. Krejcie and Morgan table was used to select 136 sample populations. Given that the participants are from six different organizational districts, random sampling classification method was used for selecting them. In order to observe the distribution of sample population properly from different districts, the proportional selection method was used taking into account the number of employees in each district. The selection of sample population from each district was random. Table 1 shows the number of personnel in each district as well as the number of selected sample from each district.

Table 1: Classification of sample size on the basis of the proportional selection method		
District	No. of Personnel	No. of sample
Management Director	47	30
Financial and support affairs	61	39
Engineering	34	22
Production	37	24
Planning	21	14
Customer service	11	7
Total	211	136

Data Collection Procedure

Two questionnaires constituting closed questions were used for collecting the data. Both first and second hand information was the sources of the data. The data collection was carried out via library method (books, articles, dissertations, theses, internet, and database) and survey (requesting experts to validate measurement tools). The questionnaires include two sections. The first section devoted to the demographic information of the personnel which is followed by the main questions of the research. The reliability of the questionnaires was measured at standard level and their face validity was confirmed. Cronbach α was used to estimate the inner coherence of the questionnaires. The type of the questionnaire was Likert scale (5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree). The validity of KM questionnaire was estimated 0.80 and the validity of creativity questionnaire was estimated 0.90 using SPSS version 19. Both of the questionnaires had high validity.

Table 2: Research variables		
Variable	No. of questions	Cronbach α
Knowledge creation	1-6	0.918
Knowledge storage	7-16	0.815
Knowledge sharing	17-27	0.761
Knowledge application	28-32	0.743
Knowledge management	1-32	0.808
creativity	1-12	0.902

RESULTS

Pearson correlation coefficient and multivariable regression analysis were the statistical analyses used for analyzing the data as well as the statistical tool of SPSS version 19.

Table 3: Demographic information of the participants		
Gender	Male	82.4%
	Female	17.6%
Age	20-30	11%
	30-40	44.1%
	40-50	39%
	>50	5.9%
Educational level	Diploma	5.9%
	A.A/A.S.	9.6%
	B.A/B.S.	70.6%
	M.A/M.S.	13.9%
Field of study	Engineering (different majors)	40.7%
	Water engineering	5.6%
	Management	17.6%
	Accounting	17.6%
	Public Health	3.7%
	Humanity	8.3%
	Vocational	6.8%
Job experience	<5	14%
	5-10	19.1%
	10-20	42.6%
	20-30	22.2%
District	Planning Deputy	10.3%
	Engineering and Development Deputy	16.2%
	Financial and Support Deputy	28.7%
	Costumer Deputy	5.1%
	Management Director	22.1%
	Production Deputy	17.6%

The descriptive analysis of the dependent and independent variables show that the computed Mean of KM for the personnel is 3.25. Bearing in mind that the optimum degree of KM is 5 and the most undesirable level is 1, the estimated Mean of KM for WSO personnel was higher than average. Regarding the personnel's creativity, the computed score was 3.62 indicating fairly high creativity. The recorded Mean for the knowledge creation was 3.56 indicating an acceptable level. Similarly, the obtained Mean for the knowledge storage was 3.47, which means over average level. The estimated Mean for knowledge sharing was about 3 (2.96) showing lower than average level of sharing knowledge among the personnel. The mean of knowledge application was estimated 3.04 indicating average level.

Kolomogorov-Smirnov test was used to determine the normality of the data. It was used to detect the normality of the understudy variables (i.e., knowledge creation, storage, sharing and application as well as creativity).

Table 4: Normality of variables						
Variable	creativity	Knowledge creation	Knowledge storage	Knowledge sharing	Knowledge application	Knowledge management
Kolomogorov-Smirnov	1.324	1.075	0.790	0.831	1.186	0.678
Sig.	0.06	0.198	0.561	0.495	0.12	0.747

As the table shows there is no significant difference between the distribution of variables and normal distribution which indicates the normality of the distribution of all variables. Thus, we had to use parametric test for analyzing the proposed hypotheses. In other words, Pearson's correlation coefficient was used to verify the hypotheses.

Table 5: Correlation coefficient among variables					
variables		No. of sample	Pearson correlation	Sig.	validated /rejected
KM	creativity	136	0.534**	0.000	validated
knowledge creation	creativity	136	0.532**	0.000	validated
knowledge storage	creativity	136	0. 363**	0.000	validated
Knowledge sharing	creativity	136	0. 365**	0.000	validated
Knowledge application	creativity	136	0.448**	0.000	validated

As illustrated in Table 5, Pearson correlation coefficient between KM and creativity was estimated 0.53 showing a direct relationship between these two variables. To be more precise, the application of KM in an organization will increase the creativity of its personnel. The obtained Pearson correlation coefficient between personnel's knowledge creation and creativity was 0.53 which indicates a direct relationship between them. In other words, the more new and brand ideas created by WSO personnel, the more creative they would be. According to Pearson's correlation coefficient, the relationship between WSO personnel knowledge storage and creativity was estimated 0.36 which refers to a direct and average relationship between these two variables. The relationship between WSO personnel's knowledge sharing and creativity was computed as 0.36 which indicates direct but lower than average relationship between them. It means that the more WSO personnel share their knowledge, their creativity increases. The correlation coefficient between knowledge application and creativity of WSO personnel was computed as 0.44 which indicates direct and average relationship between these two variables. Thus, the more WSO personnel use knowledge, the more creative they are.

Following is the results of multivariable regression analysis of the data.

Table 6: Summary of Multivariable Regression Analysis			
R	R Squre	Adjusted R Square	Std. Error of the Estimate
0.606[a]	0.368	0.348	0.573

a. Predictors: (Constant), knowledge storage,sharing ,application and creation

As table 6 shows, the correlation coefficient is R= 0.606 which indicates a high correlation among dependent and independent variables. The estimated R square= 0.368 shows that 36.8% of the modifications of dependent variable (i.e., creativity is due to the discussed independent variables in this study). The remaining changes (63.2%) are because of other independent variables which were not discussed in the present study. The four independent variables that affect the creativity of WSO personnel more are presented here in the order of importance:

X1= Knowledge creation, X2= knowledge application, X3= knowledge sharing
X4= knowledge storage

Table 7: Multivariable regression and ANOVA					
ANOVA[b]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	25.026	4	6.257	19.037	0.000[a]
Residual	43.054	131	.329		
Total	68.080	135			
a. Predictors: (Constant), knowledge storage,sharing ,application and creation b. Dependent Variable: Creativity					

As it is shown in Table 7, the results of ANOVA for the model obtained from multivariable regression analysis are statistically significant. Another output of regression model is the significance of regression model which is estimated by F. The measured P=0.000 shows the significance of regression model at 99% level.

| Table 8: Multivariable regression coefficient model					
Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.587	0.466		1.261	0.210
knowledge creation	0.450	0.087	0.409	5.156	0.000
Knowledge application	0.237	0.143	0.131	1.665	0.098
Knowledge sharing	-0.070	0.114	-0.064	-0.616	0.539
knowledge storage	0.269	0.099	0.282	2.706	0.008
a. Dependent Variable: Creativity					

Table 8 illustrates the coefficient of proposed model in multivariable regression. Beta indicates that knowledge creation has the highest regression coefficient (0.45), while knowledge sharing has the lowest regression coefficient (-0.07). Taking into account the above mentioned facts, a general equation of regression line would be:

Creativity= 0.587+ knowledge creation (0.45) + knowledge application (0.269) + knowledge sharing (-0.07) + knowledge storage (0.237)

$$r= 0.587 + 0.45 X1 + 0.269 X2 - 0.07 X3 + 0.237 X4$$

To identify Beta coefficient path, we will have a close look at the column of important and effective variables.

Fig.2: Analysis of Personnel's creativity path
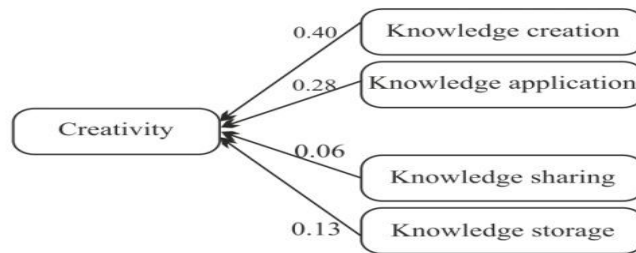
According to the findings of the study, the following suggestions are proposed:

A: suggestions for the betterment and improvement of west Azerbijan WSO personnel's creativity in the order of importance:
- Creative individuals should be supported by the master directors
- Potential use of specialized personnel's capabilities and experiences
- Paying attention to the balance between the job and employee's capability
- Strengthening criticizing and accepting criticism among personnel
- Creating link between personnel's mental knowledge, innovation and solving the problems of organization
- Encouraging personnel to join group work and team learning
- Evaluating the performance of six districts and then comparing their performance with each other to raise competition among individuals from different districts which would contribute to the performance efficiency of that specific district

B: suggestions to improve and increase knowledge creation of west Azerbijan WSO personnel in the order of significance:
- Establishing knowledge project systems, innovation supporting devices, competitive intelligent tools, artificial intelligent systems, intranet (inner organization communication system to exchange information), and weblog (as a feedback to different ideas and insights which takes place very fast).
- Establishing scientific groups through rewarding systems for the staff who learn and teach
- Providing opportunities for the personnel to present their ideas and testing them to solve the problems of organization and then appreciate them

C: suggestions to improve knowledge storage among west Azerbijan WSO personnel in the order of priority:
- Providing the personnel with the information about the development and progress of organization via internet or journal
- Establishing rewarding system and suggestion system to document and share prominent personnel's knowledge and experience

D: Suggestions to improve knowledge sharing among west Azerbijan WSO personnel in the order of prominence:
- Being supported by the master managers to use organizational knowledge for exchanging information
- Holding meetings biannually, establishing E-journal in the organization's website
- Presenting successful experiences among staff in different districts and the repetition of prosperous experiences
- Increasing less experienced personnel's knowledge by developing link and connection between experienced personnel to transfer their knowledge to the young and new employees
- Holding international conferences and inviting active and successful civil organizations of water and sewage industry to use their experience in increasing the quality and quantity of the organizational activities

E: Suggestions to improve knowledge application of west Azerbijan WSO personnel in the order of importance:
- Investing and devoting budget to make use of KM and implementing it
- programming to absorb elites and experts as the knowledge personnel
- Having access to high speed internet and intranet
- Teaching the skills of advanced search in net to use KM

DISCUSSION AND CONCLUSION

In the present knowledge era organizations emphasize on human capital as a tool to achieve sustainability and competitive privileges by making use of KM. The directors of organizations should steadily encourage their personnel to creativity and innovation. They should try to motivate them in increasing the effective implication of KM in the organization. The results of the study by Hassanbeigi (2010) suggest that sharing of knowledge has positive effect on the organizational creativity [7]. Furthermore, some key factors that affect the success of KM can increase creativity in organizations. According to Ansari (2011), there is a meaningful relationship between KM and creativity [8]. The findings of Tagizadeh and Tarri (2008) show the positive and significant effect of both KM and creativity on the development of organizations. However, KM affects organizational development more than creativity [9]. As aforementioned, all the major and minor assumptions proposed for the present study were validated. The results of multivariable regression analysis showed a high correlation among dependent and independent variables. Whereas 36.8% of the dependent variable (i.e., creativity) is affected by independent variables investigated in this study; there are other variables that affect creativity which were not in the scope of this study.

The model used in this study is among the models suggested by KM experts to be used in modern dynamic organizations. In Sum, according to Jushpara's (2004) suggested model, west Azerbijan WSO has to deal with the following issues to be able to make use of the effective processes of KM:
- Detecting the strategies that the organization needs to improve and make progress
- Investigating the present knowledge of the personnel and the knowledge they need
- Evaluating the learning abilities of the personnel
- Making use of advanced and up dated soft ware to fill the gap between knowledge creation and knowledge storage
- Personnel should participate in such activities as personal study, periodical and in-service trainings, sharing acquired knowledge to change the organization to a learned one

Implications of the Study

Both the managers and employees of WSO would benefit from the results of this study as they become familiar with the effects of KM in increasing their creativity, knowledge development and how to use KM more efficiently. WSO can increase the personnel's creativity to make them compatible with the goals of the organization through the application of KM.

Suggestions for Further Research

- Given that the present study was carried out in west Azerbijan province, it is suggested that similar researches can be done in other provinces to back up the findings of the study and to see to what extent the results are compatible with the current findings.
- Doing similar researchers in other organizations provides the chance to compare the results with each other.
- Similar studies can be carried out in the organizations with similar goals and duties the results of which can be used as criteria to compare WSO with other organizations.
- This study can be repeated using different dimensions and models of KM.
- To investigate the effective factors on creativity, different dimensions of it can be used for further studies.

Acknowledgments

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