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Designing Cognition Model of Knowledge Effect on Employees' Creativity (Case Study: Police Engineering Administration)

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ABSTRACT

Objective: Today, knowledge sharing has determinant role in promotion of various industries and organizations as an element of knowledge management. According to daily incremental importance of knowledge as the most critical resource for competitive advantage, organizations try to find effective ways of knowledge sharing among employees. Knowledge sharing is considered as an important and principal part of knowledge management, and creative employees are promoter and dynamic force of organizational activities. **Methodology:** This research tries to design a model to make relationship between knowledge sharing and employees' creativity. Therefore, related factors were identified to perceive knowledge sharing and also employees' creativity, and some data was obtained using questionnaire. In order to study the relationship among variables and their effects on each other, structural equation model (SEM) was used by Lisrel software. **Results:** Results of this research show the positive and direct effect of knowledge sharing on employees' creativity. **Conclusion:** Technological conditions have an important role in knowledge sharing, and managers of IRI police engineering administration must have always mention that more focus on technological conditions increase knowledge sharing in IRI police engineering administration.

1. Introduction

In today's competitive world, enterprises need to use marketing techniques and conduct specialized marketing
Knowledge is one of the vital promoting force for business in achieving success. Organizations have mentioned knowledge incrementally every day and use minds more than hands in recruitment. Consequently, organizations behave with knowledge like their tangible resources, and find knowledge management as a tool to improve and protect their competitive power (Azad and Rashidi, 2008). Knowledge management cycle is constituted by set of processes whose quadruple set includes knowledge creation, knowledge storage, knowledge sharing, and knowledge application (Aryan, 2011). One of the most important announced priorities by researchers of knowledge management is making motivation in people to share knowledge (Sohrabi et al., 2010). Knowledge sharing has been proposed as a vital and important element for organizations to extend their integrated services, sharing resources, and attempt to promote organization learning, creativity, and innovation (Sadeghi Malamiri, 2007; Karimi et al., 2010). Therefore, knowledge sharing is a process by which people interact their knowledge, change intrapersonal knowledge to organizational knowledge, provide opportunities potentially to learn new experiences, exercise, and execute experiences, skills, and abilities (Human, 2008). Although, some believe that knowledge is power, it seems that knowledge doesn't have power itself, but it gives power to people that is a part of shared knowledge with others (Sadeghi Malamiri and Raeisi, 2010). The reasons of the importance of knowledge sharing is that it reduces costs, improves performance, improves the provided services to customers, reduces time of developing new products, reduces delay in goods delivery to customers, and finally reduces related costs to find and access to valuable knowledge inside organization (Sohrabi et al, 2011). Knowledge sharing needs durable commitment, creativity, and interactive learning processes. Therefore, identification the effective factors on people tendency to share knowledge are so important, and organizations must have specific attention to it (Khatamianfar, 2009; Alipour Darvishi, 2012).

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Table 1. Effective factors on knowledge sharing and employees' creativity

Index	*Sub-index*	*References*	*Code*
Social conditions	Education and learning	Endres 2007, Ma 2008, Sohrabi 2009, Raesi 2011, Khatamianfar 2009, Lin 2009, Karimi 2010	E1
	Sense of commitment to job	Raesi 2011, Khatamianfar 2009, Yang 2009, Yu 2004,	E2
	Reliance among employees	Hislop 2003, Pahlevani 2010, Alipoor 2012, Ma 2008, Lin 2008, Alavi 2007, Panahi 2012, Khatamianfar 2009, Huang 2009, Lin 2009, Kim 2008, Hsu 2007, Gruber 2001, Karimi 2010, Jafari 2015	E3
Organizational conditions	Leadership and commitment of senior management	Pilevari 2011, Ma 2008, Raesi 2011, Ma 2008, Sohrabi 2009, Khatamianfar 2009, Yang 2009, Gruber 2001, Taheri 2015	S1
	Participatory culture	Hislop 2003, Lin 2008, Sohrabi 2009, Mehregan 2011, Pilevari 2011, Hasanali 2002, Yu 2004, Karimi 2010, Jafari 2015, , Taheri 2015	S2
	Reward system	Endres 2007, Lin 2008, Raesi 2011, Pahlevani 2010, Alavi 2007, Sohrabi 2009, Khatamianfar 2009, Kim 2008, Gruber 2001, Karimi 2010, Taheri 2015	S3
	Organizational climate	Hislop 2003, Gao, 2004, Khatamianfar 2009	S4
Technological conditions	Communicational technologies	Pilevari 2011,Turban 2006, Raesi 2011, Sohrabi 2009, Pahlevani 2010 , Alavi 2007, Sohrabi 2009, Kim 2008, Karimi 2010, Taheri 2015	T1
	Cooperative technology	Turban 2006, Raesi 2011, Yu 2004, Karimi 2010, Taheri 2015	T2
	Storage and recycling technology	Turban 2006, Raesi 2011, Pahlevani 2010, Alavi 2007, Sohrabi 2009, Alipoor 2012, Mehregan 2011, Kim 2008, Karimi 2010 , Taheri 2015	T3
Motivation	tendency to success	Shalley 2004, Sadeghi Mal Amiri 2009, Satton 2001, Jahani 2011	A1
	Taking challenge	Sadeghi Mal Amiri 2009, Barbara 2003, Jahani 2011	A2
Personality traits	uncertain	Amabile 1998, Barbara 2003, Sadeghi Mal Amiri 2009, Jahani 2011	V1
	Taking risk	Amabile 1998, Sadeghi Mal Amiri 2009, Salley 2004	V2
Cognitive skills	Intelligence and talent	Torrance 1988, Runco 2007, Amabile 1998, Sadeghi Mal Amiri 2009	M1
	Knowledge and specialty	Conelly 2001, Amabil 1998, Runco 2007, Sadeghi Mal Amiri 2009, Jahani 2011	M2

2. Materials and methods

2.1 Methodology

This research is applied and according to data collection and analysis is descriptive-correlative. This research is descriptive, because it describes the conditions of variables and the relationships among them, and it is correlative, because it tests and determines simultaneous relationship among variables by correlation analysis and SEM. In conducting this research, first literature review was identified by librarian method of effective indexes on knowledge haring and employees' creativity (Jahani and Sarchahani, 2011; Jaffari, 2015).

Reliability: in this research, Cronbach's alpha coefficient of total questionnaire in pre-test in a 32-member sample was estimated 0.887. This is higher 0.7 and acceptable.

Validity: according to the strong backgrounds of models and also considering the variables of main models, the questionnaire was measured, it and its content were examined by supervisors and consultor professor, their modifying ideas were inserted, and structural validity was confirmed using confirmatory factor analysis (CFA).

Assessment of conceptual model: in order to assess the model, a questionnaire with 9 questions was given to professors and academic scholars in knowledge management, and scores of indexes in table (2) shows agreement higher than 60%. Therefore, conceptual model had efficient validity to the mentioned objective according to their ideas (Pahlavi et al., 2010).

Table 2. Scores of model indexes according to scholars

Variables	*Mean*	*Variance*	*Std. dev*	*Variables*	*Mean*	*Variance*	*Std. dev*

Social conditions	77.95	175.30	16.25	Motivation	72.17	294.28	14.38
Organizational conditions	77.35	207.30	13.05	Personality traits	73.98	287.75	12.29
Technological conditions	74.65	205.92	13.34	Cognitive skills	77.38	313.05	13.52

2-Drawing path diagrams in standard and significant coefficient estimation mode (T-value)

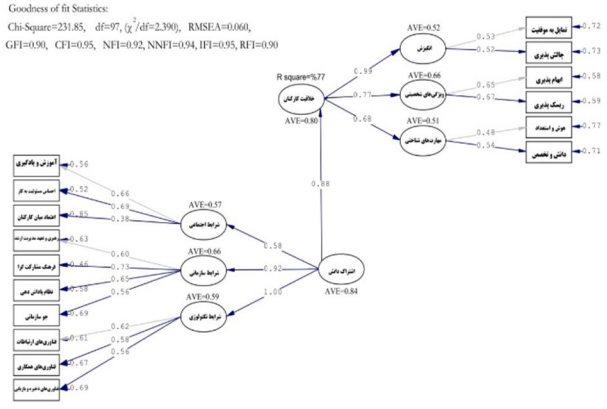

Diagram 1. Second order SEM in standard coefficient estimation mode

Diagram (1) shows the first and second order SEM in standard coefficient estimation mode. All research variables are divided into 2 classes of latent and manifest variable. The latent variables themselves are divided to endogenous, downstream, exogenous, or upstream. Endogenous variable is impressed by the other variables in model. In contrary, the exogenous variable isn't influenced by any variable in model; although, it influence on other variables. In this research, knowledge sharing is exogenous, and employees' creativity is endogenous variable. Numbers or coefficients are divided into 2 classes in this research. Determination coefficient of employees' creativity was obtained 0.77 and shows that knowledge sharing could explain 77% of employees' creativity. The rested 23% is related to the prediction error and can include the other effective factors on employees' creativity. In this model, the mean determinant variance is also shown. In order to calculate the convergent validity, Fornell & Larcker suggested using AVE^2 criterion. AVE is shown. In minimum AVE of 0.5, validity indexes have proper convergence. Therefore, the convergent validity is confirmed for all variables. Actually, this index studies how much the latent variable is able to explain its indexes variances (its manifest variable) in average. This coefficient is summarized for all research variables in table (3), and AVE index in this research is more than 0.5 for all variables; hence, convergence validity of model structure is confirmed (Mehregan et al., 2010).

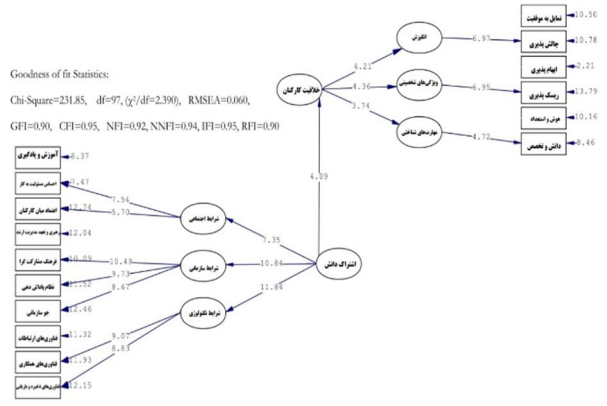

Diagram 2. Second order SEM in sig. level (T-value)

Diagram (2) shows second order SEM in t-value. According to this model, path coefficient and functional load are significant in 95% sig. level if t-value is out of (-1.96, +1.96) range. Functional load or path coefficient is not significant if t-value is inside (-1.96, +1.96) range. Path coefficient and functional load are significant in 99% if t-vale is out of (-2.58, +2.58).

3. Discussion and results

3.1 Model Interpretation and Fitting:

Generally, each obtained index in working with Lisrel is not reason of fitting or non-fitting alone, but these indexes must be beside each other and then are interpreted. If and second fitting test showed model is fitted properly, it moves to indicate the fitted factors in model and focus on them, table (3) shows the most important them and that model has proper condition according to determination and fitting. All these indexes show model fitting with the observed data. Model fitting indexes shows the fitting of the model measurement, because ratio of Chi square on the degree of freedom is less than 3, RMSEA is less than 0.1, and other indexes are acceptable. In other words, the general model and framework is significant and acceptable.

Table 3. Indexes of model fitting

Index	*Estimates Model*	*Limitation*
(Chi-square, the degrees of freedom)	2.390	Less than 3
GFI (goodness of fit index)	0.9	Higher than 9.0
RMSEA (root mean square error of approximation)	0.06	Less than 0.1
CFI (comparative fit index)	0.95	Higher than 9.0
NFI (normed fit index)	0.92	Higher than 9.0
NNFI (non-normed fit index)	0.94	Higher than 9.0

3.2 Correlation Coefficient to study the relationship among research variables

Table (4) shows the matrix correlation among the talent variables. One relationship among the latent variables in SEM is based on association. Association is a relationship between 2 variables in one model bit it is non-directional, and its nature is evaluated by co-relational analysis. Pearson correlation coefficients show the direct and significant relationship among all variables in 95% sig. level. For example, motivation variable has direct and significant relationship in 95% sig. level with personality traits, cognitive skills, social conditions, organizational conditions, technological conditions.

Table 4. Pearson correlation coefficients

Variables	*Motivation*	*Personality traits*	*Cognitive Skills*	*Social conditions*	*Organizational conditions*	*Technological conditions*
Motivation	1	Sig<0.01	Sig<0.05	Sig<0.05	Sig<0.01	Sig<0.01
Personality traits	0.233	1	Sig<0.01	Sig<0.01	Sig<0.01	Sig<0.01
Cognitive Skills	0.283	0.146	1	Sig<0.01	Sig<0.01	Sig<0.01
Social conditions	0.281	0.177	0.264	1	Sig<0.01	Sig<0.01
Organizational conditions	0.442	0.255	0.323	0.395	1	Sig<0.01
Technological conditions	0.459	0.312	0.296	0.327	0.626	1

Table 5. Confirmatory factor analysis

Confirmatory factor analysis	*Latent variables*	*Manifest variables*	*Factor loadings*	*t-value*	*Dog. level*	*Result*
first order	Motivation	tendency to succeed	0.53	Fixed	<0.01	significant
		Challenging	0.52	6.97	<0.01	significant
	Personality traits	Uncertain	0.65	Fixed	<0.01	significant
		Risk taking	0.67	6.95	<0.01	significant
	Cognitive Skills	Talent and intelligence	0.48	Fixed	<0.01	significant
		Knowledge and expertise	0.54	4.72	<0.01	significant
	Social situation	Teaching and learning	0.66	Fixed	<0.01	significant
		sense of responsibility to work	0.69	7.54	<0.01	significant
		Trust between employees	0.38	5.70	<0.01	significant
	Organizational conditions	Leadership and commitment of senior management	0.6	Fixed	<0.01	significant
		Participatory Culture	0.73	10.49	<0.01	significant
		Reward system	0.65	9.73	<0.01	significant

		Organizational climate	0.56	8.67	<0.01	significant
	Technological conditions	Communicational technologies	0.62	Fixed	<0.01	significant
		Cooperation technologies	0.58	9.07	<0.01	significant
		Storage and marketing technologies	0.56	8.83	<0.01	significant
Second order	Creative Staff	Motivation	0.99	4.1	<0.01	significant
		Personality traits	0.77	4.36	<0.01	significant
		Cognitive Skills	0.68	3.74	<0.01	significant
	Share knowledge	Social conditions	0.58	7.35	<0.01	significant
		Organizational conditions	0.92	10.84	<0.01	significant
		Technological conditions	1.00	11.84	<0.01	significant

3.3 Responding to research hypotheses based on SEM

Another form of relationship among the latent variables in SEM is direct effect. Direct effect in actually one constitutional elements of SEM and shows the directional relationship between 2 variables. This types of relationships are mostly evaluated by ANOVA. This effect id actually indicator of the assumed causal relationship of one variable on another. In each mode, direct effect indicates the relationship between an independent and dependent variable. Although, a dependent variable can be independent variable in another direct effect vice versa.

Table 6. Path coefficient, t-value, and results of research hypotheses

Hypotheses	*Path coefficient (β)*	*t-value*	*Sig. level*	*result of the researcher's hypothesis*
Knowledge sharing →employees' creativity	0.88	4.09	<0.01	Confirmed

Main Hypothesis: knowledge sharing has significant effect on employees' creativity.

H0: knowledge sharing has significant effect on employees' creativity.

H1: knowledge sharing doesn't have significant effect on employees' creativity.

According to the obtained results from path coefficient and t-value in table (6) and also the standard coefficients, and sig, level, it is indicated that knowledge sharing is significant on employees' creativity in 99% sig. level. (T-value is out of (-2.58, +2.58) range). According to the positive beta, this relationship is directional and positive. Therefore, in 99% sig. level, it is expected employees' creativity increases by increasing knowledge sharing and decreasing by decreasing knowledge sharing. Consequently, research hypothesis is confirmed in 99%.

In order to make questionnaire and discovering the constitutional factors of each structure, first and second order of CFA was used. Results of the first and second order of CFA are summarized in table (5). First and second order loads which were related to research structures were all tested in 5% and 1% error level. All functional loads were significant in 99% (t-value was out of (-2.58, +2.58) and could make significant level in measuring the related structure.

4. Conclusion

4.1 Results and Discussion

SEM and particularly path analysis were used in this research to reject or confirm hypotheses. Lisrel software was used for this analysis. Path analysis examines the relationships among several variables, while the probable relationship among them was neither rejected nor confirmed. In order to make decision about rejection or confirmation of hypotheses, the outputs of software were used. Therefore, before judgment about this relationship, the mode fitting must be assured. After satisfaction from model fitting, two important outputs are extracted from software based on which the hypotheses can be rejected or confirmed. These are output in standard estimation mode and significant mode. Significant model output shows t-value for each path. If the shown numbers on each path of thee second output is bigger than 1.96 or smaller than -1.96 by considering α=0.05, the association between two variables will be significant. Otherwise, dependent variable can't explain the changes of independent variable significantly.

After processing data by structural equation tools and software and studying research conceptual model for the main hypothesis, the secondary hypotheses are as following:

In addition, studying on the main hypothesis showed that:

There is positive and significant relationship between "knowledge sharing" and "employees' creativity" in IRI police engineering administration.

According to figure (1), knowledge sharing influences employees' creativity 88% significantly. Confirmation of this hypothesis states the positive and significant relationship between knowledge sharing and employees' creativity. In addition, the positive path coefficient shows the alignment of changes. Increase in knowledge sharing is effective on increasing employees' creativity.

It was observed according to the obtained results:

All three mentioned index in model have positive and direct effect on knowledge sharing.

Technological conditions have an important role in knowledge sharing, and managers of IRI police engineering administration must have always mention that more focus on technological conditions increase knowledge sharing in IRI police engineering administration.
Moreover, organizational conditions of engineering administration, particularly participatory culture us the most effective factor in knowledge sharing in ORI police engineering administration. Of responsibility to work and organizational environment is the most important priority of social conditions to share knowledge. This research shows that people with more risk taking are considered creative in IRI police engineering administration.
Notice: it is noticeable that the strategy of knowledge sharing s a continuous attempt that must always be alive and flow in organization.

4.2 In order to improve knowledge sharing in IRI police engineering administration (between the desirable and present conditions), following cases are suggested:

- IRI police engineering administration must have more investment in social, organizational, and technological fields to increase knowledge sharing.
- IRI police engineering administration must prioritize the technological conditions and provide better and extensive communicational technologies, cooperation, storage, and marketing.
- Managers must have more attempt to make trust among employees of IRI police engineering administration according to the obtained results.
- Employees with sense of responsibility to work in workplace must be identified and have rewarded to increase this sense in employees.
- Managers must keep the participatory culture alive and dynamic in IRI police engineering administration by giving proposal to share ideas about decision making and better conduction of operational tasks to express creativity in employees by people knowledge sharing and experiences.
- Studying the other factors such as competitive environment factors, customers need in discerning knowledge sharing and analysis the gap between the present knowledge sharing and sharing the desirable knowledge.
- It is suggested to provide a system to analyze the sensitivity of functional indexes in this research using simulation conceptions to be evaluated by knowledge sharing or change of each indexes.
- It is suggested to study and formulate evaluation designing model of knowledge sharing effect on employees' creativity in scientific and research institutions and agencies.

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