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# EXPLORING RELATION BETWEEN ORGANIZATIONAL INFRASTRUCTURE AND KNOWLEDGE SHARING – A CASE OF COMPANIES IN REPUBLIC OF MACEDONIA

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## Abstract

*Knowledge sharing is a key part of the knowledge management initiatives. To have a successful business case of knowledge management project, a supporting organizational infrastructure should be developed. Organizational infrastructure represents backbone of KM initiatives. In this article we explore the relation between organizational infrastructure and knowledge sharing, as one of the most important phases in the cycle of knowledge management on a case of companies from Macedonia. Knowledge can add value to the organization only if it's shared throughout the company.*

*Key words: Knowledge management, organizational infrastructure, knowledge sharing, knowledge transfer, tacit knowledge, explicit knowledge*

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## Introduction

Organizations have taken different views on knowledge sharing. Some, believing that there is a danger in giving away secrets or viewing sharing as a diversion from individuals' primary work, have not encouraged sharing. Others, believing that there is great potential benefit in disseminating knowledge within an organization and perhaps beyond its boundaries, support it. Of course, the tenets of knowledge management presume that sharing is generally both beneficial and necessary if an organization is to realize its potential (William R. King p. 2008).

Knowledge sharing is one of the most critical steps in knowledge management activities. To achieve effective knowledge sharing, it is important to encourage workers to share their knowledge for the best interests of the firm (Dong-Joo Lee a, Jae-Hyeon Ahn p.938 2006). However sharing is hard to ensure, because knowledge is generated and initially stored within the employees. As Puccinelli (1998) states, "knowledge is fundamentally a product of people and not technology. Sharing is such a valuable component to the success of KM because it focuses on the human side of knowledge (p. 40)"(Jen-te Yang 2007 p.345).

Knowledge as an asset is critical to organizations to achieve competitive advantage. But knowledge as an asset like information has different features compared to material resources. Knowledge can add value to the company only if it's shared throughout the organization. Knowledge which resides in the head of the people or in the databases in the organizations and it's not used can not add value to company working. There is one interesting fact about knowledge sharing. Sharing does not mean reducing own level of knowledge. Person who is sharing his knowledge with other employees is not losing his own knowledge. That is not property of material assets. If knowledge was lost through sharing probably the world would look differently than today covered with silence and closed mouth. Also at the same time people are afraid that if they share their knowledge and expertise they will lose their power in the organization. This people may hoard knowledge and be reluctant to share it.

Many authors are making clear distinction between knowledge transfer and knowledge sharing. For the purpose of our research we are not making this type of distinction. Contrary here in this research under term knowledge sharing we understand the total construct of shared knowledge, which means: knowledge which is shared between individuals and teams, interpersonally and through support of technology, unidirectional or multidirectional direction. Main focus of our research is to test the relation between some variables which constitute organizational infrastructure and knowledge sharing. Also the scope of the paper is limited only on knowledge which is shared within the organization. Knowledge sharing between organizations and outside the organization is not considered in this paper.

Also in this paper under term knowledge sharing both tacit and explicit knowledge is understood because we do not make clear distinction between knowledge transfer and knowledge sharing. Research conducted in past has confirmed that explicit knowledge which can be codified and documented is also easier to be transferred than tacit knowledge which can not be articulated. Documentation of knowledge is important when considering transferability of knowledge (Zander and Kogut 2006).

This article is exploring the relation between organizational infrastructure variables and knowledge sharing including both tacit and explicit knowledge. Thus, variables which support transfer and sharing knowledge were included in the regression analysis.

## **Organizational infrastructure**

Activities in the domain of knowledge management would not yield success if there is no organizational infrastructure which will support KM initiatives. Today, a firm's employees must share their knowledge; indeed, such activities have become a competitive necessity (Wing S. Chow \*, Lai Sheung Chan p. 458 2008).

Sheng Wang and Raymond A. Noe (2010) have conducted deep literature review in the field of knowledge sharing. In their paper they have developed framework for knowledge sharing research including organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors. This framework is very similar to our model of organizational infrastructure. Most of the variables that we have constructed cover the same area although our research is more general and narrow.

Using system approach four main organizational subsystems were identified in the model of Michael J. Marquardt which supports organizational learning: organization, people, technology and knowledge management practices (Michael J. Marquardt 2002). In this research the variables which constitute the organizational infrastructure which need to support knowledge sharing were derived from systems learning organizational model of Marquardt.

Three main subsystems were derived from the model of Michael J. Marquardt and variables were constructed. These three main subsystems represent: people, technology and organization. Variables were constructed for all three subsystems. People as a subsystem involves: team work, level of trust and level of knowledge as variables. Technology includes a single variable named as a maturity of information systems. Organization as a subsystem includes several variables which were tested: organizational structure, strategy, mission, reward systems, organizational culture, professional training and participative management style. The influence of all these variables on knowledge sharing was tested and the results presented in the section empirical study are only those which has confirmed researcher hypothesis about influence on knowledge sharing.

## Empirical study

Knowledge sharing is one of the most critical steps in knowledge management activities. To achieve effective knowledge sharing, it is important to encourage workers to share their knowledge for the best interests of the firm. However, successfully exerting this encouragement is very challenging.

An on line survey on 53 companies was conducted to collect data for modeling and regression analysis. Companies from various industry sectors were involved in the survey. The rate of response on the survey was 53%. Industry structure of the participants was following: production 36%, banking and insurance 22%, trade 16%, IT industry 14%, telecommunication 8% and other 8%.

A model which contains six independent qualitative variables was created which compose organizational infrastructure: organizational culture, level of trust, reward system, participative management style, maturity of information systems, and professional training. In the model are included only those hard and soft management variables which have influence on knowledge sharing as independent variable based on our research in companies in Macedonia. The construction of the variables can be different as well and some other research might show different results.

In this research testing of relation between 5 more variables and knowledge sharing was conducted (organizational structure, strategy, and mission, level of knowledge and team work) but no relation was identified. Thus, those variables are not included into the model. At the beginning of the research researchers were expecting to identify relationship between those variables and knowledge sharing as well. But all results should be seen through the light of research limitations like small number of observations, shallow scope of the research, lack of information of the respondents about the questions in the survey, using single method for analyzing the data etc. Bellow we briefly explain the meaning of the independent variables.

*Open organizational culture* as a variable includes attitudes, values, expectations, customs, employee behavior and communication within a particular company. Higher values for open culture represents type of culture which is open for changes, new ideas, opinions which support knowledge sharing through its customs, organizational stories and informal networks.

*Participative management style* as a variable represents organizational practices which provide employee involvement in decision making and encourages the involvement of stakeholders at all levels of an organization in the analysis of problems and implementation of solutions. A higher value for this variable represents a style of management, which provides support for all stakeholders to participate in the decision making process at all organizational levels.

*Maturity of information systems* as a variable represents the capacity of information systems to transfer already codified knowledge and to support sharing knowledge among employees, through collaborative tools. A higher value for this variable means higher capacity and greater support for knowledge transfer and sharing.

*Reward system* as a variable is analyzed through the perspective of the design of the rewarding system in a particular organization. Through this variable we wanted to test whether companies which have a rewarding system focused on rewarding employees who actively share knowledge achieve higher values for organizational knowledge sharing. Higher values for this variable means that an organization have a rewarding system which supports knowledge sharing through promotion and giving different kind of financial and social rewards.

*Professional training* is a variable which shows that a particular company organizes professional training, workshops and seminars which need to stimulate employees to put their knowledge on disposal to their colleagues and satisfy organizational hunger for knowledge refreshment. Higher values for this variable represents a state where companies are organizing regular training and team building seminars to create informal networks which will support knowledge sharing throughout organization.

*Level of trust* as a variable represents mutual respect of the ownership of ideas among employees. Members of the organization need not to be afraid that their manager or colleague will steal their idea and reward. Higher values for this variable correspond to higher trust and respect within the organization and assume stronger knowledge sharing.

A single independent variable was created as weak knowledge sharing which also is a qualitative variable. Higher values for this variable correspond to an organizational climate where employees are not sharing their knowledge and the organization is not utilizing appropriately the knowledge potential of its own members. Lower values for this variable represent stronger sharing of knowledge among all employees throughout the company.

Variables which are included in the model are qualitative and obtain values from 1 – lowest to 5 – highest. The influence of all independent variables was tested on dependent variable. In this research were using regression techniques like ordered probit (technique which use normal distribution) and ordered logit (which use logical distribution). These techniques were used because they are the most suitable techniques for a research where dependent variable is a qualitative and we test dependencies between qualitative variables.

The following table shows the influence of the independent variables on single dependent variable with values in a range from 1 - 5. 5 represent stronger presence than 4, 4 represent stronger presence than 3, 3 represent stronger presence than 2 etc. In this kind of regression models for accurate interpretation of the results it's important to analyze two key elements: first, sign in front of the coefficient of the independent variable and second, statistical significance of the coefficient.

A positive sign of the coefficient in front of the independent variable means that higher values for independent variable increase the probability for higher values of the dependent variable and vice versa. If the sign in front of the coefficient is negative than, higher values for independent variable increase the probability for lower values of dependent variable. Statistical significance of the coefficient shows whether we can identify causal relationship or dependence between the independent variable and dependent variable. The existence of dependence was tested by calculating p – value which represents the lowest level of significance for which null hypothesis can be rejected or p value is equal to null. If p – value is lower or equal to 0,1 (10%) than statistical significance is 10%. In that case the value of the coefficient is not equal to statistical zero, which means that independent variable has influence on the dependent variable. In this research we use level of significance  $\alpha = 0,1$  or 10%. Relatively high level of significance was chosen because this research represents testing influence between qualitative variables where it's more difficult to identify dependences among qualitative variables.

The results are presented in the following table:

**Table 1:**

Independent variables	Weak knowledge sharing
Open organizational culture	Coefficient (-0,989605)
	P – value (0,0001)
Participative management style	Coefficient (-0,82143)
	P – value (0,0002)
Maturity of information systems	Coefficient (-0,4817)
	P – value (0,0309)
Reward system	Coefficient (-0,28721)
	P – value (0,0951)
Professional training	Coefficient (-0,21576)
	P – value (0,0031)
Level of trust	Coefficient (-0,69885)
	P – value (0,0007)

Negative sign in front of 6 variables shows that higher values for open organizational culture, participative management style, maturity of information systems, professional training, reward system and level of trust increase the probability for lower values of weak knowledge sharing. Lower values for the dependent variable weak knowledge sharing represents case where a particular organization have better knowledge sharing between organizational members. The dependences between all six independent variables and single dependent variable were proven through this exploration. In the appendix of the article are presented all the data which were used for testing the influence of components of organizational infrastructure on knowledge sharing among employees.

The results in table 1 have met the expectations of the researchers and the initially formulated hypothesis. Most of the variables which were tested have shown influence on knowledge sharing. This means that companies who want to utilize benefits from knowledge of their employees need to build supporting infrastructure. Without infrastructure it's not possible to achieve higher level of knowledge sharing throughout the organization and if knowledge is not shared and resides within the heads of the people than it's useless. Both of the researchers strongly believe that relationship exist also between the variables which were not includ-

ed in the model but were tested. Some limits of the research did not provide enough data those assumptions to be proven. This paper brings value especially for the companies in R. of Macedonia because the model identifies the variables which have strong influence on knowledge sharing. Thus, companies can focus their effort to support those variables in order to be able to utilize benefits from knowledge sharing.

## **Conclusion**

The main goal of this research was to test the relation between organizational infrastructure and knowledge sharing in the companies in R. of Macedonia. We wanted to conduct this type of research on a specific business environment for companies in Macedonia. Through the results of the research we had intention to help managers from Macedonia to identify more easily the most important components of organizational infrastructure which support knowledge sharing. Thus, managers will be able to focus their effort to strengthen those elements in own organizations which stimulate knowledge sharing and provide them better utilization of the benefits from knowledge sharing.

This paper has confirmed the strong relation which exists between organizational infrastructure and knowledge sharing. Although some of the components which were tested did not show existence of dependence we strongly believe that research limitations were main cause for such results. Future improvements of the research can be done in order to obtain even more accurate results and create even better pathway for the managers in Macedonia.

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## Appendix

### 1. Results obtained from testing

Dependent Variable: Weak knowledge sharing  
 Method: ML - Ordered Probit (Quadratic hill climbing)  
 Date: 12/28/08 Time: 15:07  
 Sample: 1 53  
 Included observations: 53  
 Number of ordered indicator values: 4  
 Convergence achieved after 5 iterations  
 Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
LEVEL OF TRUST	-0,69885	0,205141	-3,40669	..0,0007

Dependent Variable: Weak knowledge sharing  
 Method: ML - Ordered Probit (Quadratic hill climbing)  
 Date: 12/28/08 Time: 15:08  
 Sample: 1 53  
 Included observations: 53  
 Number of ordered indicator values: 4  
 Convergence achieved after 5 iterations  
 Covariance matrix computed using second derivatives

	Coefficient	Std. Error	z-Statistic	Prob.
MATURITY OF INFORMATION SYSTEMS	-0,481701	0,223175	-2,1584	..0,0309



Exploring relation between organizational...

Dependent Variable: Weak knowledge sharing	.....
Method: ML - Ordered Probit (Quadratic hill climbing)	.....
Date: 12/28/08 Time: 15:08	.....
Sample: 1 53	.....
Included observations: 53	.....
Number of ordered indicator values: 4	.....
Convergence achieved after 5 iterations	.....
Covariance matrix computed using second derivatives	.....
	Coefficient Std. Error z-Statistic ... Prob.
OPEN ORGANIZATIONAL CULTURE	-0,989605 0,249324 -3,96915 ... 0,0001


Dependent Variable: Weak knowledge sharing	.....
Method: ML - Ordered Probit (Quadratic hill climbing)	.....
Date: 12/28/08 Time: 15:09	.....
Sample: 1 53	.....
Included observations: 53	.....
Number of ordered indicator values: 4	.....
Convergence achieved after 4 iterations	.....
Covariance matrix computed using second derivatives	.....
	Coefficient Std. Error z-Statistic ... Prob.
PARTICIPATIVE MANAGEMENT STYLE	-0,821426 0,222088 -3,69866 ... 0,0002

Dependent Variable: Weak knowledge sharing	.....
Method: ML - Ordered Probit (Quadratic hill climbing)	.....
Date: 12/28/08 Time: 15:09	.....
Sample: 1 53	.....
Included observations: 53	.....
Number of ordered indicator values: 4	.....
Convergence achieved after 4 iterations	.....
Covariance matrix computed using second derivatives	.....
	Coefficient Std. Error z-Statistic ... Prob.
REWARD SYSTEM	-0,287209 0,172063 -1,66921 ... 0,0951

Dependent Variable: Weak knowledge sharing	.....
Method: ML - Ordered Probit (Quadratic hill climbing)	.....
Date: 12/28/08 Time: 15:10	.....
Sample: 1 53	.....
Included observations: 53	.....
Number of ordered indicator values: 4	.....
Convergence achieved after 4 iterations	.....
Covariance matrix computed using second derivatives	.....
	Coefficient Std. Error z-Statistic Prob.
PROFESSIONAL TRAINING	-0,215757 0,073069 -2,95279 0,0031

## 2. Data used for construction of the variables

Num.	Level of trust	Maturity of information systems	Open organizational culture	Participative management style	Reward system	Professional training	Level of trust	Weak knowledge sharing
1	3	2	3	2	2	1	2	4
2	4	2	4	4	3	1	4	4
3	4	5	4	3	2	1	4	3
4	4	4	4	4	4	6	4	2
5	4	3	2	2	2	6	3	3
6	4	3	4	4	4	6	3	2
7	5	4	4	4	4	1	1	2
8	4	3	4	4	2	6	4	2
9	3	4	4	4	4	1	4	2
10	4	2	4	2	3	1	4	4
11	4	4	4	4	4	4	4	2
12	4	4	4	3	3	5	4	2
13	5	4	4	3	3	1	4	3
14	5	3	3	2	3	1	3	4
15	4	4	4	4	3	3	4	3
16	4	3	4	2	2	1	4	4
17	1	3	2	2	2	1	2	5
18	4	3	4	4	3	5	4	2
19	4	4	4	4	2	6	4	4
20	3	3	3	3	2	1	2	4
21	4	3	4	4	3	6	4	3
22	2	3	3	2	4	1	2	4
23	2	3	3	3	3	5	4	4
24	4	4	5	4	2	1	5	2
25	4	4	3	3	2	1	4	4
26	4	2	3	3	4	1	3	3
27	4	4	4	4	3	1	4	4
28	4	4	4	3	2	1	4	3
29	4	4	4	4	4	5	4	2
30	5	3	3	3	2	2	4	3
31	5	4	4	3	4	5	4	2
32	4	3	3	4	3	1	4	2
33	4	3	3	3	4	6	4	2
34	4	4	4	4	3	6	5	4
35	4	4	4	3	4	6	4	2
36	4	4	3	3	4	2	5	5
37	2	4	2	2	1	1	4	4
38	3	3	2	3	3	1	4	4
39	4	4	2	4	4	1	4	4



40	4	4	4	3	4	6	4	4
41	1	2	2	2	5	1	1	5
42	3	3	3	2	2	1	4	4
43	4	4	3	4	4	6	5	4
44	5	4	4	4	2	4	4	2
45	4	4	4	4	3	6	4	4
46	4	4	4	4	4	5	2	2
47	3	4	4	5	3	6	4	2
48	4	4	4	3	4	6	5	2
49	4	3	4	4	2	1	4	4
50	4	4	4	4	4	1	4	2
51	3	4	3	3	2	4	3	4
52	3	3	3	4	3	3	3	2
53	4	4	4	3	4	6	4	2