

COMBINATION OF KNOWLEDGE IN THE SYSTEM SUPPLIERS - MSP - CUSTOMERS IN THE TRANSITIONAL ECONOMY ENVIRONMENT IN SERBIA

MSc Marija Savić*

University of Belgrade, Tehnical Faculty in Bor, Bor, Serbia

MSc Predrag Đorđević

University of Belgrade, Tehnical Faculty in Bor, Bor, Serbia

Dr Đorđe Nikolić

University of Belgrade, Tehnical Faculty in Bor, Bor, Serbia

Dr Ivan Mihajlović

University of Belgrade, Tehnical Faculty in Bor, Bor, Serbia

Dr Živan Živković

University of Belgrade, Tehnical Faculty in Bor, Bor, Serbia

The paper presents the results of research of the combination of knowledge in the system: suppliers - SMEs - consumers in case of SMEs in Eastern Serbia. A theoretical model of a combination of knowledge was established in the investigated system. By using the statistical analysis of the results a satisfactory statistical significance of acquired results was determined, which allowed the testing of the defined model using LISREL software package. The results show the importance of the established hypotheses for the impact of the cooperation with suppliers on a combination of knowledge, as well as the combination of knowledge of customers and suppliers on the creation of the new knowledge in SMEs. The hypothesis about the positive influence of the sharing of knowledge with customers on the combination of the knowledge in SMEs has not been proven. These facts suggest that SMEs in Serbia do not collaborate with their customers. The cause of such a situation is the lack of system quality (SQ) in the SME sector in Serbia, as well as not applying the principles of TQM practices, which provides the best explanation of the short life cycle of SMEs in Serbia and the inability of their internationalization.

Key words: SMEs, Customers, Suppliers, Knowledge, Combination, LISREL

INTRODUCTION

The concept of small and medium enterprises (SMEs) is particularly developed in the U.S., and has recently been experiencing an expansion in Europe [01]. The development of SMEs in Europe is slower because of the barriers in the process of starting a new business and the fear of failure [02, 17]. SMEs in developed economies are complementary to large companies, which provides them with safety in their work, growth and development [10, 02]. In transition economies in post-communist countries (countries of the former USSR, the countries of the former Warsaw Pact, countries that emerged from the disintegration of Yugoslavia....) there is a great desire, among entrepreneurs, to create

their own businesses and to start new SMEs, but many attempts have been unsuccessful. Unsuccessful attempts were usually caused by a lack of knowledge of entrepreneurs, who gained their experience in the state-owned companies. In the educational systems in these countries, until recently, there were no elements pertinent to the field of private enterprise, therefore the knowledge to start and run a private business was obviously lacking among entrepreneurs [03, 04].

In Serbia, which has been going through the transitional process for a long period of time, the expansion of the starting SMEs actually takes place after the year 2000. The motivation for the creation and development of SMEs is growing during 2009 and onwards, due to the global economic crisis and high unemployment.

* Tehnical Faculty in Bor, Vojske Jugoslavije 12, 19210 Bor, Serbia; msavic@tf.bor.ac.rs
Paper presented at the SIE 2012

In such conditions, the survival of SMEs during the period of economic crisis is becoming more difficult, which causes many SMEs to fail. Development Strategy for SMEs can be defined as the creation of knowledge and the concepts of utilizations and adaptation of knowledge artifacts (knowledge artifact) which are necessary for the key elements of the SMEs functioning (Jarzabkowski and Wilson, 2006). Many studies show that the knowledge is transferable in certain organizational systems such as TQM [18].

According to the theory of entrepreneurship, SMEs innovative behavior is conditioned by a combination of knowledge that is widespread, which means that different individuals know different things [26]. Science has established networks of knowledge [05] through the various concepts, such as learning through a network, relationship memory [07, 22]. Within the concept of entrepreneurial activities, innovative behavior is caused by a combination of knowledge which can be created within the concept of knowledge networks of SMEs with their customers and suppliers [23], which in many cases can lead to the creation of the new knowledge [22]. In terms of globalization of the market, many SMEs become more international [28, 17] and the terms of the concept of creating a network of development produce good results, leading to the emergence of entrepreneurial firms with high technological performance as a consequence of the accumulation of knowledge in the process of combining knowledge [26].

The system suppliers - SMEs - customers, if the activity of SMEs is internationalized, creates good opportunities for the creation of a network of different knowledge whose combination can create a new knowledge which presents a basis for growth and development of SMEs (Street and Cameron, 2007). In terms of transitional economy in Serbia, with high entropy in the system suppliers - SMEs - customers, the creation of the new knowledge, by combining existing knowledge in certain areas of the defined system, can be a good starting point for improving the performance of SMEs in Serbia.

THEORETICAL BACKGROUND AND HYPOTHESES

Many SMEs have a problem with limited resources, which limits their business activity on the market, where they operate in one way in activities on domestic market, and in different way

in the process of internationalization of business. Very often the missing resources cannot be provided through the proprietary possession, therefore SMEs become dependent on the resources they utilize from the network with customers and suppliers [28]. In accordance with the substantive arguments of this study, SMEs are dependent on the knowledge network of clients and the knowledge networks of suppliers, because these categories provide different knowledge which is the instrument for combining the knowledge [27]. Knowledge derived from these networks, in the case of SMEs, may consist mainly of market knowledge (consumer preferences, market conditions) and technological innovation [25].

Market knowledge is usually associated with a network of consumers, but may be associated with the network of suppliers. Technological knowledge is usually associated with a network of suppliers, but may be also connected to the network of consumers. Knowledge within the networks of SMEs with customers and suppliers can be acquired by reacting to exogenous situations, as well as through conscious and planned efforts by SMEs [26]. Modern SMEs should be actively operating in the network capabilities of customers and suppliers, which implies that they must work to change the existing combination of knowledge and to find new ones. These findings enable definition of the following hypotheses:

H1 Supplier knowledge positively affects the combination of the knowledge in SMEs.

H2 Customer knowledge positively affects the combination of the knowledge in SMEs.

Research suggests that knowledge-based view serves as an important tool for understanding the spread of entrepreneurial firms [21]. Current knowledge is not sufficient and requires constant accumulation regardless of whether SME operates at the local level or the international level [16]. Therefore, SME performance depends on its ability to create knowledge, to combine it order to achieve the objectives required by the market [28]. It was determined that the business opportunities are improving more rapidly and developing more innovatively with the knowledge that is being actively developed as opposed to the knowledge gained by experience over time [08]. Activities that take place through a combination of knowledge adjusted dynamics of the SMEs with the dynamics of the market. Therefore, the combination of knowledge will enhance the ac-

cumulation of knowledge which will enhance the performance of SMEs. These facts allow the definition of the following hypotheses:

H3 Combining knowledge of suppliers and customers has a positive impact on the creation of the knowledge in the SMEs.

Based on the defined hypothesis it is possible to define a theoretical model of a combination of knowledge in the system suppliers-SME-customers to increase the knowledge, in order to increase the performance of SMEs, Figure 1.

DISCUSSION OF RESULTS

The studies presented in this paper were carried out through a questionnaire given in Appendix A [28]. Studies were conducted in the Eastern Serbia in a total of 536 SMEs, by surveying entrepreneurs during the visit to their firms. The questionnaire was administered in a way that the interviewer conducted an interview with the entrepreneur. The questionnaire has four groups of dependent variables (DV) supplier knowledge (DV-1), customer knowledge (DV-2), knowledge combination (DV-3) and the creation of knowledge (DV-4), within which 10 independent variables are contained.

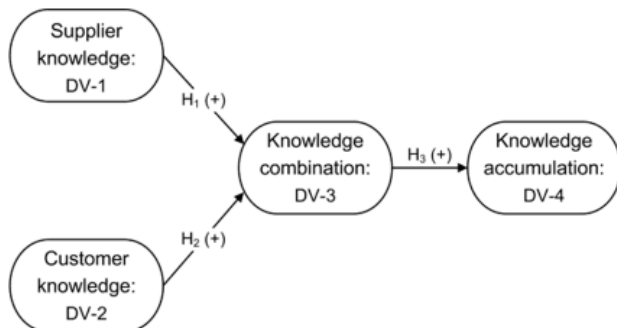


Figure 1: The theoretical model of the combination of knowledge in the system: suppliers - SMEs – customers

The demographic structure of the sample is as follows: with the sample of entrepreneurs, in the most devastated part of Serbia, 71% were men and 29% were women entrepreneurs. Most of the SMEs were as follows: 75% had up to 10 employees, 22% had 10-30 employees and 3% had 50-250 employees. Time from starting a business: 11% up to 1 year; 18% 1-3 years; 25% 3-5 years; 24% 5 – 10 years and 22% over 10 years. Investigated SMEs belong to the sector of: agriculture - 11%; transport - 24%; industry - 5%; tourism - 7%; service sector - 45% and healthservice - 8%. Demographic characteristics of the sample indicate that the dominant struc-

ture in the SMEs belongs to the service sector, the existence of most companies was noted to be up to five years and that the dominant structure of entrepreneurs male.

Likert's five-point scale (1 - completely disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - completely agree) was used for testing, with results presented in this paper. This methodology has been used in numerous previous studies [18, 14, 24, 15], which justifies the validity of the utilized methodology.

A statistical analysis of the results obtained in our research and validation of theoretical models defined in Figure 1. were performed by using the software packages SPSS v18 and LISREL (Linear Structural Relationship) v16. For the empirical validation of the hypothetical model, Figure 1., a SEM [22]. In the statistical analysis of the validation of the defined models, firstly one-dimensionality was confirmed, using factor analysis (PCA), across all 10 groups of latent variables in the considered model. The values obtained by factor analysis are shown in Table 1. To ensure the reliability and validity of the research model a control measurement model was defined on which confirmatory factor analysis (CFA) was performed. CFA analysis confirmed the good fit of the control model, which practically verifies that 10 defined variables describe, in a reliable way, the four latent class variables, defined in the research model, Figure 1.

Consistency of variables, defined in the framework of latent classes in the investigated model, was measured by the size of the Cronbach's alpha [09]. Acquired values of the Cronbach's alpha > 0.7, Table 1, show good consistency of certain variables within the four defined latent groups of variables in the investigated models. Cronbach's alpha value for the whole population is 0.98, so the obtained data can be considered reliable for the testing of the proposed model [06].

The values of the t-tests are used to test the hypothesis that the sample does not differ from the population, which shows the tendency of the normal Gaussian distribution; t values should be greater than 2. Results obtained in Table 1 show that in all cases t - values are greater than 2, with the significance level of $p < 0.05$, which indicates that values in the tested model, are statistically reliable [12].

To study the discriminant validity of various groups of questions the Structural Equation Modeling (SEM) was performed, by comparing pairs of latent class-

defined questions on the principle of two by two. Table 2 shows the results of discriminative validity and the correlation between the four groups of questions. Positive values of Pearson's coefficient were obtained

with statistical significance of $p < 0.05$, which indicates that the correlation of random pairs of groups of latent variables are true [19].

Table 1: The results of the factor analysis and CFA analysis of the investigated model

Groups of questions	Considered variable	Factor analysis (EFA)		Confirmatory factor analysis (CFA)		
		PCA		Reliability		Convergent validity
		% of variance explained by one-dimensional factor	Factor loading	Cronbach's alpha	Factor loading	t-statistics
Supplier knowledge: ZV-1	L1 L2	67.343	0.911 0.804	0.891	0.830 0.703	4.13* 8.19*
Client knowledge: DV-2	L1 L2	82.392	0.861 0.906	0.942	0.836 0.932	6..56* 6.14*
Knowledge combination: DV - 3	L1 L2 L3 L4	49.937	0.718 0.842 0.872 0.975	0.956	0.631 0.775 0.769 0.845	6.53* 4.04* 5.10* 6.74*
Knowledge creation DV - 4	L1 L2	89.236	0.881 0.801	0.956	0.887 0.775	8.02* 4.75*

* $p < 0.05$

Correlations between pairs of latent classes of variables, associated to the defined model, Figure 1. have values of Pearson's coefficients generally above 0.12 (coefficients marked bold in Table 2). The highest value of correlation exists between knowledge of suppliers and knowledge combinations (0.44 with $p < 0.05$), indicating that entrepreneurs perceive the dominant influence on customer knowledge on the knowledge combination in SMEs. The lowest correlation with the value of Pearson's coefficient of 0.12 with $p < 0.05$ refers to the influence of a combination of knowledge of customers and suppliers on the creation of the new knowledge, indicating a poorly developed mechanisms for combining knowledge with the goal to create new knowledge in terms of SMEs operation under the conditions of transitional economy in Serbia.

Table 2: Analysis of the discriminant validity correlation of the latent class-defined questions

Groups of variables	DV- 1	DV- 2	DV- 3	DV-4
DV- 1	1			
DV- 2	0.39*	1		
DV- 3	0.14*	0.44*	1	
DV- 4	0.31*	0.33*	0.12*	1

To test the validity of the model defined in Figure 1. software package LISREL v16 was used for statistical data analysis, considering that the statistical reliability of the data for the model validation is satisfactory.

Firstly, the values of indicators were determined, which determine whether the proposed model adequately fits the input data. The results of the analyzed fitting indicators are shown in Table 3. Goodness-of-fit index (GFI) is the extent to which the model is applicable in comparison with the case where a model does not exist. Good fitting is indicated with GFI value above 0.90 [18]. In this case the value of GFI of 0.96 is above the threshold.

V Indicator Root Mean Square Error of Approximation (RMSE) shows the errors that occur during the approximate connection of populations. Good value of the RMSA indicators is within the limits of 0.08 – 0.10. The obtained value of this indicator 0.081 shows, together with the GFI indicator, a satisfactory coincidence.

In addition to GFI and RMSA indicators for assessing the quality of fitting the following indicators are also being used: Normed fit index (NFI), Comparative fit index (CFI), Incremental Fit In-

dex (IFI) Relative Fit Index (RFI). Following values were obtained in the tested model : 0.92, 0.92, 0.93 and 0.92, respectively. The values were above 0.9 therefore they can be regarded as absolutely satisfactory. Also, an indicator of Minimum Fit Function Chi-Square/Degree of Freedom $X^2/d.f.$ should be considered, which in this case has a value of 1.93, where the required value should be less than 3.

Table 3: Summary values for the fitting indicators

Indicators of the fitting statistics	Values obtained in the model	Recommended values
$X^2/d.f.$	$59.97/31 = 1.93$	< 3.0
RMSEA	0.081	0.08 – 1.0
GFI	0.96	> 0.9
NFI	0.92	> 0.9
CFI	0.92	> 0.9
IFI	0.93	> 0.9
RFI	0.92	> 0.9

The obtained values of the considered fitting indicators of indicate a satisfactory level of fitting in the suggested model which suggests that the regression coefficients of the paths can be calculated in the defined theoretical model in Figure 1. By using LISREL v16 the path-regression coefficients were determined (correlations between the latent class variables defined in the model which is shown in Figure 1) and the obtained results are shown in Figure 2. The results in Figure 2. indicate that the hypotheses H1 and H3 in the defined model have positive values of path coefficients with the values for t above 2 and the statistical significance of $p < 0.05$, indicating that these hypotheses are confirmed. The obtained value of - 0.10 for the path coefficient of the H3 hypothesis is negative and $t = - 0.29$, indicating that H3 is not proven.

CONCLUSION

Bearing in mind the proposed hypothetical model of knowledge creation by combining knowledge in the system suppliers - SME - customers in SMEs in the transition economy in Serbia, Figure 1., and obtained results in Figure 2., hypothesis H1 and H2 were confirmed while the hypothesis H3 is not confirmed. Hence, it was confirmed that knowledge has a positive effect on the combination of entrepreneurial skills of a company, as well as on developing the dependence on supplier knowledge networks which have a

positive effect on the entrepreneurial combining of knowledge of firms and the creation of new knowledge, which in accordance with the results of the investigation of SMEs in Sweden [26].

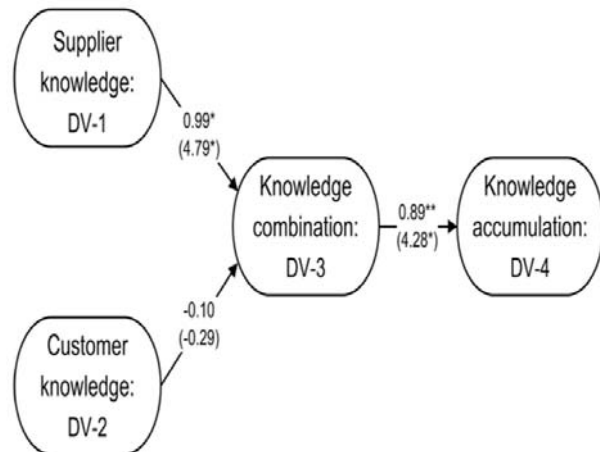


Figure 2: Structural model of the combination of knowledge in the system: suppliers - SMEs – customers in Serbia (t - values in parenthesis) Level of significance: * < 0.05

Our research has shown that information obtained from clients do not have a positive effect on the combinations of entrepreneurial firms knowledge, which means that manufacturers do not rely on knowledge of clients (consumers) because it does not contribute to new knowledge in entrepreneurial firms.

This result can be explained by under-developed marketing function in the investigated SMEs in Serbia, which indicates a low level of compliance with the requirements of clients, including the lack of TQM practices in investigated SMEs. Transitional conditions in Serbia: the reforms, restructuring, price liberalization, the establishment of a strong private sector and the fulfillment of the EU requests, still holds Serbian borders closed for major business projects, which is slowing down the internationalization of Serbian SMEs.

Due to the confusing situation in the market customers have lost their vision of what they want in the market, and suppliers use this as an opportunity to sell to the market what they have, by providing favorable terms of payment of purchased goods. Most entrepreneurs are determined to purchase goods offered by suppliers, while not being informed if customers have a demand for it or not. Due to the organizational and business culture in Serbia overloaded with transitional restrictions, client's culture, and primarily due to a lack of quality standards, most of the SMEs are

confident that they will sell on the Serbian market whatever they offer.

APPENDIX A

QUESTIONNAIRE

DV-1 (Supplier knowledge)

1. Your relationships with key suppliers depend on information, knowledge and experience you acquire from them.
2. Your relationships with other suppliers in the market depend on information, knowledge and experience you acquire from them.

DV - 2 (Client knowledge)

1. Your relationships with key clients depend on information, knowledge and experience you get from them.
2. Your relationships with other clients in the market depend on information, knowledge and experience you get from them.

DV-3 (combination of knowledge)

1. Business partners (customers and suppliers) are a source of information, knowledge and experience to you.
2. The relationship with your business partners (customers and suppliers) is characterized by mutual adjustments
3. The relationship with your business partners (customers and suppliers) is characterized by an exchange of information, knowledge and experience.
4. How familiar are you with the business partner's (customers and suppliers) information, knowledge and experience?

DV-4 (Knowledge creation)

1. The relationship with your business partners (customers and suppliers) result in the creation of new products/new services.
2. The relationship with your business partners (customers and suppliers) result in new procedures, practices of the organizational details etc. in your company.

REFERENCES

- 1) Acs., Z.J., Dana, L.P., Jones, M., (2003) Toward new horizons: The internationalization of entrepreneurship, *Journal of International Entrepreneurship*, 1:5-10.
- 2) Audretsch, D.B., Thurik, A.R., (2000) Capitalism and democracy in the 21st century: from the managed to the entrepreneurial economy, *Journal of Evolutionary Economics*, 10: 17-34.
- 3) Benzing, C., Chou, H.M., Shabo, B., (2005) Hungarian and Romanian entrepreneurs in Romania – motivation, problems and differences, *Journal of Global Business*, 16: 77-87.
- 4) Benzing, C., Chu, H.M., Kara, O., (2009) Journal of Small Business Management, Entrepreneurs in Turkey: A factor analysis of motivations, Success factors and problems, *Journal of Small Business Management* 47(1): 58-91.
- 5) Bolomstermo, A., Eriksson, K., Lindstard, A., Sharma, D., (2004) The perceived usefulness of network experimental knowledge in the internationalizing firm, *Journal of International Management*, 10(3): 355-374.
- 6) Bou-Luslar, J.C., Escrig – Tena, A.B., Roca-Puig, V., Beltran – Martin, I., (2009) An
- 7) Cegerra – Navarro, J., (2007) Linking exploration with exploration through relationship memory, *Journal of Small Business Management*, 45(3): 333- 354.
- 8) Crick, D., Jones, M.V., (2000) Small high-technology firms and international high – technology markets, *Journal of International Marketing*, 8(2): 63-85.
- 9) Crombach, J.I., (1951) Coefficient alpha and the internal structure in tests, *Psychometrika*, 16: 297 – 334.
- 10) Dyer, J.H., Nobeoka, K., (2000) Creating and managing a high –performance knowledge – sharing network : the Toyota case, *Strategic Management Journal*, 21(3):345-368.
- 11) Empirical assessment of the EFQM excellence model: Evaluation as a TQM framework relative to the MBNQA model, *Journal of Operations Management*, 27 : 1 – 22.
- 12) Ho, R., (2006) Handbook univariate and multivariate data analysis and interpretation with SPSS, Central Queensland University Rockhampton, Australia
- 13) Jarzabkowski, P. And Wilson, D.C., (2006) Actionable strategy knowledge: A practice perspective, *European Management Journal*, 24(5): 348-367.
- 14) Kale, P., Singh, H., Perlmutter, H., (2000) Learning and protection of proprietary assets in strategic alliances: building relational capital, *Strategic Management Journal*, 21, 217- 237.

- 15) Kayank, H., (2003) The relationship between total quality management practices and their effects on firm performance, *Journal of Operations Management* 21(4), 405 – 435.
- 16) Knight G.A., Cavusgil, T., (2004) Innovation organizational capabilities and the Born-global firm, *Journal of International Business Studies*, 35(1): 124-141.
- 17) Moen, O., (2002) The born globals: A new generation of small European exporters, *International Marketing Review*, 19: 156 – 175.
- 18) Molina, L.M., Montes, L.J., Moreno, A.R., Relationship between quality management practices and knowledge transfer, *Journal of Operations Management*, 25: 682-701.
- 19) Moris, H. DeGroot, Mark S. Schervish (2002) *Probabilty and Statistics*, Addison – Wesley, p.485.
- 20) Omerzel, G.D., Antončič, B., (2008) Critical entrepreneur knowledge dimensions for SME performance, *Industrial Management & Data systems*, 108(9): 1182 – 1199.
- 21) Rialp, A., Rialp, J., Knight, G.A., (2005) The phenomenon of early internationalizing firms: what do we know after decade (1993-2003) of scientific inquiry , *International Business Review*, 14(2):147-166.
- 22) Soda, G., Usai, A., Zaheer, A., (2004) Network memory: the influence of past and current networks on performance, *Academy of Management Journal*, 47(6): 893-906.
- 23) Street, C.T., Cameron, A.F., (2007) External relationships and the small business: a review of small business alliance and network research, *Journal of Small Business Management*, 45(2): 239 - 266.
- 24) Tari, J.J., Molina, J.F., Castejon, J.L., (2007) The relationship between quality management practices and their effects on quality outcomes, *European Journal of Operational Research*, 183: 483- 501.
- 25) Thorpe, R., Holt, R., Macpherson, A., Pittaway, L., (2005) Using knowledge within small and medium-sized firms : a systematic review of the evidence, *International Journal of Management Reviews*, 7(4): 257-281
- 26) Tolstoy, D., (2009) Knowledge combination in a foreign-market network, *Journal of Small Business Management*, 47(2):202-220.
- 27) Uzzi, B., Lancaster, R., (2003) Relational embeddedness and learning: the case of bank Loan Managers and their clients, *Management Science*, 49(4): 383-399.
- 28) Zahra, S.,Matherne, B., Carleton, J., (2003) Technological resource leveraging and the internalisation of new venture, *Journal of International Entrepreneurship*, 1(2): 163- 186.

Paper sent to revision: 14.09.2012.

Paper ready for publication: 07.12.2012.