



RELATIONSHIP BETWEEN LEARNING, KNOWLEDGE CREATION AND ORGANISATIONAL PERFORMANCE

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Abstract

In the paper we suggest a model of organisational learning (OL) consisting of four connected constructs related to the processes of learning and knowledge creation, and organisational performance. With the use of structural equation modelling we confirm strong positive relationships between constructs of information acquisition, knowledge creation and cognitive and behavioural changes, all together leading to changes in organisational performance. We also recognise information interpretation as a process positively related to knowledge creation but on the other hand related neither to cognitive and behavioural changes nor organisational performance. The findings explain OL from the viewpoints of single and double loop learning and emphasise the importance of introducing both of them in the organisation.

Keywords: organisational learning, knowledge creation, experimenting organisation, organisational performance

JEL classification: M10

1. INTRODUCTION

OL is associated with processes related to the acquisition and interpretation of information, direct learning from own experience, and learning from other organisations (e.g. organizational intelligence, benchmarking, grafting). Research associates it also with learning in terms of changing behaviour, including trial and error learning and experimental learning (Dimovski and Colnar, 1999). Lopez Sanchez *et al* (2010) in their recent paper recognise four fundamental stages of OL - information acquisition, information distribution and interpretation, and organisational memory. Besides, OL involves single loop learning, which is more error-correction oriented or incremental, double-loop learning, which is more innovative in its nature, or even triple loop learning, through which “organisations learn to learn before they are forced to learn” (Pun and Nathai-Balkissoon, 2011).

Literature review reveals that the majority of studies in the conceptualisation of OL do not include knowledge creation or/and experimentation as learning processes. Nevertheless, Levitt and March (1988), for example, recognise OL as a consequence of deliberate organizational information seeking and learning from direct experience, experimentation, and trial and error learning. Dimovski (1994) also recognises direct learning from trial and error as sources of OL. Crossan (1991) links experimental learning with behavioural

changes. Bontis *et al* (2002) recognises OL as creation of new insights, experimentation, thinking outside the traditional frames, looking at things from different angles, and developing professional skills and awareness of critical issues related to work. On the other hand, Huber (1991) notes that organisations do not use formal experimentation except in the form of research and development projects and test marketing. In spite of this, he defines so called experimenting organisation, which is “generally directed toward enhancing adaptation” and maintaining itself “in a state of frequent, nearly-continuous change in structures, processes, domains and goals”. Also, some literature on learning organisation emphasises the meaning of knowledge creation or/and experimentation. Goh (1998), for example, finds five core strategic blocks of a learning organisation – besides mission and vision, leadership, transfer of knowledge and teamwork and cooperation, he points out also the existence of experimenting organisational culture. Marsick and Watkins (2003), on the other hand, define workplace learning as “the little R&D”, “provides for ongoing experimentation, using lessons learned to draw a link between learning outcomes and changes in knowledge performance”.

As Bapuji and Crossan (2004) note, research on OL focuses mostly on (1) application of a learning perspective to study strategic issues associated with organisational performance, strategic alliances, innovation, market orientation or technology adoption indicating that OL does impact organisational performance; (2) types of external learning (i.e. congenital learning, vicarious learning, inter-organisational learning); and (3) the role of contextual variables that influence OL. Research focused on (4) learning from internal experience, which is not as often as other three research orientations, suggests that differences in performance appear due to the procedures, systems, cross-functional communication, leadership and team work. It notes that “better measures for OL than proxies such as age and cumulative experience” are needed. Besides, research related to internal learning stress out that further research should be done to account for firm-level learning processes to better understand OL and relations between different constructs within OL. Other researchers also express concern about the lack of research on learning processes. Vince *et al* (2002), for example, stress out three areas crucial for future inquiry: translation of group level learning into learning for the broader organization, the linkage between action-based and cognitive based views of learning, and the way beliefs that are brought into a learning situation interact with capabilities for action. Besides, they noticed the absence of quantitative studies focused on testing theory suggesting the use of either laboratory or larger-sample survey methods.

We base the study on findings about the lack of research on internal learning and knowledge creation as constructs of OL. The aim of the paper is to study internal learning constructs as parts of OL and relationships between these constructs. In the conceptual model we include typical OL constructs such as information acquisition, information interpretation, cognitive and behavioural changes and also the construct of knowledge creation (including experimentation), which researchers rarely include in OL models. Besides the links between OL constructs, we investigate also the relationship between OL and organisational performance. In the study we use quantitative research with larger-sample survey methods.

In the first part of the paper, we present literature review related to organisational learning and knowledge creation. In this part of the text we introduce seven hypotheses and conceptual model based on the links between the constructs. In the second part of the paper we focus on explanation of research methodology. The methodology is based on the

structural equation modelling approach (SEM) following the procedure of Koufteros (1999). The third part of the paper presents implications for practice and future research suggestions.

2. LEARNING AS INFORMATION PROCESSING

According to Shrivastava (1983), organizational learning (OL) can be defined as a process of organisational adaptation to changes in the environment with an institutionalization of experiences in an organisation, exchange of assumptions and development of organisational knowledge base. On the other hand, Stata (1989) emphasises that OL is primarily the main source of innovation. Accordingly, Leviathan and March (1993) connect OL to balancing conflicting objectives related to (1) the utilization of existing capabilities and (2) developing new knowledge (i.e. knowledge creation and experimentation).

As indicated in the brief literature review (see Table 1), OL processes mostly relate to (1) transfer of information between the environment and organisation, (2) interpretation of information within an organisation, and (3) application of information through cognitive and behavioural changes. According to this, Huber (1991) defines OL as information processing and notes that learning is often unintentional and unconscious. He notes that OL does not necessarily increase the performance of those who learn - they can learn in an incorrect way or acquire the wrong information. OL is influenced and determined by reactions of the environment and information stemming from it. March and Olsen (1975) highlight the impact of the environment on individuals' beliefs and further on, the influence of these beliefs on individual and organisational activities. For Daft and Weick (1984) OL relates to the interpretation and understanding of the links between the organizational activities and reactions of environment. On the other hand, Argyris and Schön (1978) define OL as error detection and error correction process which is the result of cognitive and behavioural changes in an organisation leading to more appropriate organisational activities. In their research Škerlavaj *et al* (2007) establish causal connections between constructs of OL showing that in an organisation ascribing greater importance to the acquisition of information leads to better interpretation of information.

Within OL conceptualisation information storage, retrieval, application, contribution and sharing (Gold *et al*, 2001) are all related to cognitive and behavioural changes (Huber, 1991; Dimovski, 1994; Slater and Narver, 1995). Kim (1993) who bases his ideas on experiential learning cycle (Kolb and Fry, 1975) links together individual and OL suggesting that only individuals can learn. They are the agents of an organisation observing things around them and learn from their own experiences - think about them, evaluate them, form abstract concepts, create individual and shared mental models and transfer the concepts into different work contexts. Levitt and March (1988) note that organisation stores these concepts in organisational routines, which directly affect its future behavioural patterns. Jones (2000) defines OL as a process through which managers try to increase organizational members' capabilities in order to understand and manage the organisation and its environment. Fiol and Lyles (1985) define learning as a process of improving an organisation's actions through better knowledge and understanding.

Many consider that the process of cognitive and behavioural changes is something which is taken for granted. Accordingly, Gold *et al* (2001) note that the effective knowledge application seems to be largely implied as opposed to treated explicitly. Nonaka and

Takeuchi (1996), for example, discuss organisation's ability to create new knowledge assuming that once the knowledge or information exists in an organisation it will be also applied effectively. On the other hand, Garvin *et al* (2008) believe that besides information collection and education and training, information transfer, analysis and experimentation should be introduced in an organisation as well to direct learning processes and practices into cognitive and behavioural changes. Additionally, Škerlavaj *et al* (2007) note that assigning greater importance to interpreting the information leads to more action in terms of behavioural and cognitive changes. On the basis of reviewed literature we pose the following three hypotheses:

H1: In an organisation, information acquisition has a positive effect on information interpretation.

H2: In an organisation, information acquisition has a positive effect on cognitive and behavioural changes.

H3: In an organisation, information interpretation has a positive effect on cognitive and behavioural changes.

3. LEARNING AND KNOWLEDGE CREATION

In OL literature two levels of learning may be recognised - lower level affecting an organisation only partially and reflecting in changes within the existing organizational structure, and higher level reflecting in changes related to general rules and norms (Škerlavaj *et al*, 2007; Trunk Širca *et al*, 2012). Argyris and Schön (1978), for example, speak about single and double loop learning, Dodgson (1993) identifies tactical and strategic learning, and Senge (1994) uses the concepts of adaptive and generative learning.

At the lower levels of learning, organisations which are passively managed only adjust to the environment. On the other hand, higher levels of learning encourage active influence on the environment (Škerlavaj *et al*, 2007), changes in fundamental norms, theories in use, objectives and policies (Argyris and Schön, 1978; Shrivastava, 1983), and modifications or replacements of basic values and assumptions (Dimovski, 1994). Obviously, both single and double loop learning require some level of information acquisition, information interpretation and they both relate to changes in behaviour and cognition, but the processes and changes in the case of double-loop learning seem to be much deeper and more long-term oriented than in the case of single loop learning. Besides, double loop learning requires continuous experimentation with continuous information feedback and verification of approaches to problem solving, while learning in a single loop or adaptive learning focuses only on solving immediate problems without checking the suitability of current approaches to learning and experimentation. It is the double loop learning which relates to knowledge creation in the first place.

The extent and the quality of cognitive and behavioural changes are positively affected by the existence of an environment which encourages double loop learning. For example, Martins and Terblanche (2003) note that successful »organisations and leaders try to create an institutional framework in which creativity and innovation will be accepted as basic cultural norms in the midst of technological and other change«. OL culture and appropriate managerial practices may be significant factors contributing to the extent creativity and innovations appear in an organisation (Judge *et al*, 1997). Organisational culture »refers to basic assumptions [...] maintained in the continuous process of human interaction« (Martins and Terblanche, 2003) and are prescriptions for ways to perform in an organization. Martins

and Terblanche (2003) recognise five crucial factors, which stimulate innovation and creativity in an organisation: strategy, structure, support mechanisms, behaviour and communication. Easterby-Smith (1990) defines experimenting organisations which generate creativity and innovation in people through the introduction of flexibility in organisational structures. Such organisations focus on unusual variations in information systems and encourage individuals to take risks (Jashapara, 2011). Kenny and Reefy (2006) recognise relationship between several cultural elements, organisation's commitment to R&D and its performance. Besides adequate resources and adequate funding, they emphasise the importance of some elements related to OL culture such as non-constraining environment, supportive management, technically competent team and appropriate strategic direction. In their research, they find a significant correlation between organisation's commitment to R&D and the number of new products and services launched. More specifically, Garvin *et al* (2008) stress the importance of three building blocks of OL culture – supportive learning environment, leadership that reinforces learning and concrete learning processes and practices including experimentation and knowledge creation.

On the basis of literature review, we set the following three hypotheses related to links between knowledge creation, information acquisition, information interpretation and changes in cognition and behaviour:

H4: In an organisation, information acquisition has a positive effect on knowledge creation.

H5: In an organisation, information interpretation has a positive effect on knowledge creation.

H6: In an organisation, knowledge creation has a positive effect on cognitive and behavioural changes.

Table no. 1 Overview of OL definitions

OL definitions	authors
a) from the viewpoint of information acquisition	
– detection of errors,	Argyris and Schön, 1978
– open-minded inquiry,	Day, 1994
– collection of data and information,	Garvin, 1993; Day, 1994
– information transfer/distribution,	Garvin, 1993; Day, 1994
– dissemination of experiments' results in the organisation.	Nadler <i>et al</i> (1992)
b) from the viewpoint of information interpretation	
– analysis, informed interpretation, reflection	Garvin, 1993; Day, 1994
– processing the information,	Huber, 1998
– accessible memory,	Day, 1994
– transformation of experience into knowledge sharing, creation of shared meanings derived from common experiences.	Cavaleri and Fearon, 1996; Meyer-Dohm, 1992
c) from the viewpoint of cognitive and behavioural changes	
– understanding of interrelationships between the organisation's action and the environment,	Daft and Weick, 1984

- updating employees' beliefs about cause-effect relationships in environmental reactions,	Lee <i>et al</i> , 1992
- changes in cognition and behaviour,	Crossan <i>et al</i> , 1995
- openness to new ideas,	Garvin, 1993
- expanding the capacity of people to create the results,	Senge, 1994
- changes in behaviour or in the range of potential behaviour, - development of new knowledge or insights with potential to influence behaviour,	Garvin, 1993; Slater and Narver, 1995; Huber, 1998
- improving organisational actions, increased organisation capacity to take effective action	Fiol and Lyles, 1985; Kim, 1993
- encoding inferences from history into routines that guide behaviour.	Levitt and March, 1988
- organisation transforming itself to better collect, manage, and use the knowledge	Marquardt, 1996
- enhancing innovation to improve quality, customer or supplier relationships, executing business strategy, and profitability.	Mills and Friesen, 1992
- error correction	Argyris and Schön, 1978
- innovation, experimentation	Stata, 1989; Garvin, 1993
d) from the viewpoint of knowledge creation	
- double loop learning requiring continuous experimentation	Argyris and Schön, 1978
- creativity and innovation accepted as basic cultural norms	Martins and Terblanche, 2003
- experimenting organisations generate creativity and innovation	Easterby Smith, 1990
- importance of practices including knowledge creation and experimentation	Garvin <i>et al</i> , 2008
- OL includes experimentation, and trial and error learning	Levitt and March, 1988

Source: [Dermol, 2010]

4. RELATIONSHIP BETWEEN ORGANISATIONAL PERFORMANCE AND LEARNING

There are quite some possible indicators one can use to measure company performance. Return on equity (ROE) measures organisation's profitability by revealing, how much profit an organisation generates with the money shareholders have invested. Return on assets (ROA) is an indicator of how profitable an organisation is relative to its total assets and it also gives an idea of how efficient management is at using an organisation's assets to generate earnings. Gorenak and Pagon (2006) note that value added per employee is also central objective measure of organisational performance related to increase in market value and higher products' or services' quality. On the other hand, Škerlavaj *et al* (2007) note that the indicators for organisational performance should be much more than just the profit, value added or some other financial measure. They are of the opinion that the aspects of all the shareholders (employees, buyers, suppliers) should be taken into consideration.

Learning increases the chances of an organisation to be successful (Kim, 1993). As already mentioned, organisational performance might be related either to financial or non-financial performance. Mills and Friesen (1992), for example, relate learning to non-financial performance measures such as encouraging innovation and improving relationships with customers and suppliers, and also to the implementation of business strategies and company profitability as one of key financial performance measures. Research which has been done by some Slovenian authors (Škerlavaj and Dimovski, 2007; Hernaus *et al*, 2008; Dermol, 2012) investigate the links between OL and organisational performance. It also indicates that both, financial and non-financial performance might be significantly related to cognitive and behavioural changes in an organisation. The authors note that only the cognitive and behavioural changes as fundamental construct of OL can lead to increased performance of an organisation. In this context, we propose hypothesis 7:

H7: In an organisation, cognitive and behavioural changes have a positive effect on organisational performance.

5. RESEARCH INSTRUMENT

The latent constructs, which we measured, were information acquisition (ACQS), information interpretation (INTRP), changes in behaviour and cognition (CHNG), knowledge creation (KNCR) and organisational performance (PRFRM). The questionnaire was designed in accordance to validated questionnaires, which can be found in respective literature. In majority of cases the respondents were asked to express their agreement with given statements using a seven-point Likert-type scale (i.e. perceptually anchored), while for CHNG and PRFRM the scales were behaviourally anchored (comparison with competition, industry averages or within time frames) and behaviourally continuous (asking respondents to report the information on ROA and value added per employee) scale items.

Content validity of the questionnaire was checked by three experts stemming from business faculties and HR departments of some larger organisations in Slovenia. Table 1 shows the number of the questions included and their sources.

Table no. 2 Items in the questionnaire and their sources

Latent construct (with examples of questions)	Number of items	Source
Information acquisition (ACQS) (e.g. we have processes for exchanging knowledge with our business partners)	3	Gold <i>et al</i> , 2001
	3	Škerlavaj <i>et al</i> , 2007
Information interpretation (INTRP) (e.g. we engage in a constructive conflict and debate during discussions)	3	Garvin <i>et al</i> , 2008
Cognitive and behavioural changes (CHNG) (e.g. technology of operation; employees' level of understanding of major problems in the company; personal communication between top managers and employees)	9	Škerlavaj <i>et al</i> , 2007
Knowledge creation (KNCR) (e.g. we experiment frequently with new ways of working; we practice brainstorming retreats or camps)	4	Garvin <i>et al</i> , 2008
	2	Wang <i>et al</i> , 2007
Organisational performance (PRFRM)	11	Škerlavaj <i>et al</i>

(e.g. return on assets; employees feel a special commitment to the company; speed of dealing with customer complaints)		<i>al.</i> , 2007
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Source: Authors compilation

6. MODEL AND RESEARCH METHODOLOGY

Figure 1 shows the model that we test in our study. The conceptual model is based on theoretical constructs discussed in the literature review.

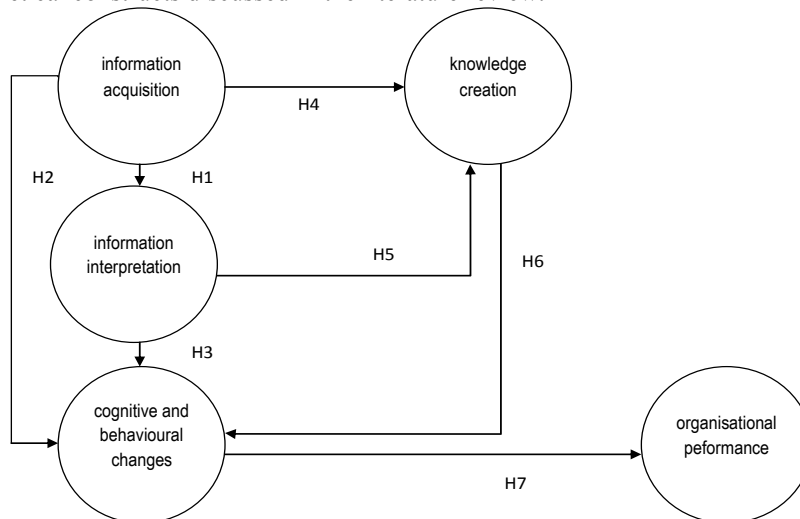


Figure no. 1 Conceptual model

The research focused on the relationships between constructs of OL was carried out during June and July 2009. We sent questionnaires to 1819 service organisations (548 large, 703 medium-sized and 568 small) located in Slovenia and received 247 completed questionnaires (19 % from large organisations, 39 % from medium-sized and 39 % from small ones). The responsiveness rate was 13.6 %. 19% of the questionnaires were completed by CEOs, 37% by heads of personnel departments, 16% by other managers, and 28% by other profiles. The indicated structure of respondents is satisfactory since in the majority of cases (at least 72%) answers were provided by individuals with expertise in the field of study. We assessed non-response bias by comparing early respondents to late respondents. Chi-square tests of independence (Armstrong and Overton, 1977) did not show any significant differences between the two groups of respondents.

There are several reasons for focusing the study on service organisations. For example, report by UNCTAD (2004) emphasises the growing importance of the service sector during past decades and unique learning challenges it has been facing in this period. In spite of this, the service factor is still insufficiently researched (Tyler *et al.*, 2007).

In the research we used a combined exploratory-confirmatory approach by following the procedure proposed by Koufteros (1999) which is iterative and contains a set of repeated calculations. The procedure consisted of the following steps:

1. Checking the quality of the acquired data, normality of data distributions with identification and correction of missing values.

2. Conducting exploratory factor analysis (EFA) with preliminary checking of unidimensionality, convergent and discriminant validity of constructs and adjustments of the measurement variables sets.
3. Conducting confirmatory factor analysis (CFA) with explicit checking of convergent validity of the measurement model, estimation of its fit and unidimensionality and checking of composite reliability and discriminant validity.
4. Evaluation of the structural model with the use of structural equation modelling procedures.

Preliminary tests of acquired data showed that, despite the elimination of missing values, the assumption of normal distribution was violated for the majority of variables. In the EFA the violation of normality might not be of extreme importance particularly when using the principal axes factoring extraction method (Field, 2005). In the CFA we tackled the problem with the use of Robust Maximum Likelihood estimation method (Diamantopoulos and Siguaw, 2000).

We used EFA to check the factors and do preliminary tests of unidimensionality, convergent and discriminant validity of measurement scales (Koufteros, 1999). That was done by SPSS statistical programme. On this basis, some “suspicious” variables were eliminated from measurement scales. We calculated Cronbach alphas for all the measurement scales. All the values were above 0.7. The scales were then used as entrance sets of indicators into the measurement model measuring latent constructs within the structural model.

In the next step we evaluated the measurement model by using CFA and LISREL programme. As already mentioned, five latent constructs were entered into this programme (ACQS, INTRP, CHNG, KNCR, and PRFRM). The EFA had shown that one of the constructs was multidimensional. It consisted of two facets - the construct PRFRM was composed of financial performance facet and non-financial performance facet. The EFA offered quite a large number of indicators as well. The model with five constructs and 35 indicators as expected from the results of the EFA would demand an estimation of at least 70 parameters. However, models with too many parameters and too many indicators per factor or construct rarely fit the data (Mannetti *et al*, 2002). This is the reason why some authors suggest aggregation of indicators to get their subsets or parcels. In this way the number of measurement variables per construct can be reduced, which means a smaller number of parameters in the measurement model (Mannetti *et al*, 2002; Williams and O’Boyle, 2008). According to the procedures explained by Nystedt *et al* (1999) and Williams and O’Boyle (2008) for each factor or construct two or three composed indicators were calculated. We used two different approaches for aggregation - factorial algorithm for unidimensional constructs and internal consistency approach for multidimensional constructs (Williams and O’Boyle, 2008). In the following step convergent validity of the measurement model, its fit, unidimensionality, composite reliability and discriminant validity were checked by using LISREL programme in compliance with the procedure proposed by Koufteros (1999). Afterwards, when we were already sure about the acceptability of the measurement model, we evaluated the structural model.

Table 3 shows fit indices and their values for the structural model. As can be seen in the table all the measures are acceptable, thus we can confirm that the structural model fits the data adequately.

Table no. 3 General acceptability of the structural model

Measures of model fit	Marginal value	Value in model	General fit
χ^2	$P \geq 0.05$	$P = 0.178$	YES
χ^2/df	$\chi^2/df \leq 2$	$X^2/df = 1.187$	YES
RMSEA	$RMSEA \leq 0.05$	$RMSEA = 0.028$	YES
NNFI	$NNFI \geq 0.9$	$NNFI = 1$	YES
CFI	CFI as near as possible to 1	$CFI = 1$	YES
standardised RMR	standardised RMR < 0.05	standardised RMR = 0.041	YES
GFI	$GFI \geq 0.9$	$GFI = 0.96$	YES
AGFI	$AGFI \geq 0.9$	$AGFI = 0.93$	YES
PGFI	$PGFI \geq 0.5$	$PGFI = 0.58$	YES

7. ANALYSIS AND HYPOTHESES TESTING

In the following step Koufteros (1999) suggests research hypothesis testing. Table 4 shows non-standardised and standardised coefficients and adequate t-values of links between the constructs in the structural model, and decomposition of the effects is also presented identifying indirect, direct and total effects of individual constructs on other constructs within the structural model. In LISREL an overall coefficient of determination (R^2) is calculated for each endogenous variable. Considering the R^2 coefficients, we have to mention that the structural equations explain 34 % of variance of INTRP, 29% of variance of CHNG, 50% of variance of KNCR and 62% of PRFRM construct.

Table no. 4 Decomposition of effects

Path (hypothesis)	Non-standardised coefficients (t-value)			Standardised coefficients		
	total effect	direct effect	indirect effect	total effect	direct effect	indirect effect
ACQS → INTRP (H1)	0.60 (6.93***)	0.60 (6.93***)	-	0.58	0.58	-
ACQS → CHNG (H2)	0.73 (5.95***)	0.47 (2.91**)	0.25 (2.58**)	0.49	0.32	0.17
INTRP → CHNG (H3)	0.17 (1.24)	-0.01 (-0.08)	0.19 (1.92)	0.12	-0.01	0.13
ACQS → KNCR (H4)	1.47 (9.31***)	0.84 (3.95***)	0.62 (3.62***)	0.61	0.35	0.26
INTRP → KNCR (H5)	1.04 (4.18***)	1.04 (4.18***)	-	0.44	0.44	.
KNCR → CHNG (H6)	0.18 (2.11*)	0.18 (2.11*)		0.29	0.29	-
CHNG → PRFRM (H7)	1.17 (8.10***)	1.17 (8.10***)		0.79	0.79	.
ACQS → PRFRM	0.85 (5.38***)	-	0.85 (5.38***)	0.39	-	0.39

INTRP → PRFRM	0.20 (1.27)	-	0.20 (1.27)	0.09	-	0.09
KNCR → PRFRM	0.21 (2.03*)	-	0.21 (2.03*)	0.23	-	0.23

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The hypotheses testing indicates that six out of seven hypotheses are supported because the corresponding parameter estimates are statistically significant as well as consistent with the direction proposed in the hypotheses. Besides direct effects corresponding to the relationships in the hypotheses, the study indicates few indirect effects as well.

The study reveals a strong, direct relationship between ACQS and INTRP constructs. In an organisation in which processes of information exchange with business partners and processes of acquiring new products' or services' information in an industry exist, and in which outside experts are a valuable source of information, it is more likely that search for confronting opinions and views appear. This causes productive conflicts and discussions about key assumptions in an organisation and affects key decisions in it. The study shows also a relatively strong direct (and indirect) relationship between ACQS and CHNG constructs. In an organisation, which acquires information in a systematic way, it is more likely that cognitive and behavioural changes appear. They are reflected in products' or services' quality, in technology implementation and speed of operations, in productivity of employees and their satisfaction, in personal communication between top managers and employees and their understanding of the major problems in an organisation, and thus in overall atmosphere in an organisation. The only relationship, which is not supported in the study, is the link between INTRP and CHNG constructs. An organisation in which processes of information interpretation exist does not seem to introduce any cognitive or behavioural changes because of this.

Nevertheless, the study confirms strong relationship between CHNG and PRFRM constructs. The construct of organisational performance include both - financial and non-financial performance indicators. The appearance of cognitive and behavioural changes is positively related to financial performance including ROA and value added per employee, and also to non-financial performance including fluctuation of employees, employees' loyalty to the organisation, customer retention rate and reputation of the organisation.

Besides, there seems to be a strong, direct (and indirect) relationship between ACQS and KNCR constructs. Namely, as the study indicates, an organisation oriented into acquisition of information usually focuses also on experimenting with new product or service offerings, on generation of knowledge, brainstorming and testing new ways of doing things as well. Additionally, such an organisation more likely introduces formal processes of evaluating experiments and new ideas, uses modelling based on analogies or prototypes and simulations when trying out new ideas. The study also confirms relatively strong, direct relationship between INTRP and KNCR constructs. In an organisation in which processes of information interpretation exist the inclination towards knowledge creation might be increased. Besides, the study confirms moderate relationship between KNCR and CHNG constructs. It seems that in an organisation in which activities related to knowledge creation are carried out more often, positive changes in cognition and behaviour appear.

Beside relationships indicated in the hypotheses, three indirect links appear in the model as well. Only two of them are statistically significant. These two indirect links stress out the importance of two constructs in the model – ACQS and KNCR. We believe that

acquisition of information and knowledge creation might play a key role in attempts to improve the performance of an organisation. The construct of INTRP seems to be positively related to KNCR, but as already mentioned the direct and indirect relationships with CHNG and PRFRM are not significant.

8. CONCLUSIONS

8.1. Research implications

Firstly, the study highlights the importance of systematic acquiring of information in an organisation. It shows that information acquisition directly as well as indirectly through the processes of information interpretation, relates to positive cognitive and behavioural changes in an organisation, but it is also associated with encouraging knowledge creation. The study also highlights relatively strong direct link between knowledge creation on one side and the occurrence of cognitive and behavioural changes in an organisation on the other. We may conclude that such a combination of single and double loop learning based on information acquiring, information interpretation, and knowledge creation significantly contribute to the quality of products and services, intensive use of modern technologies, higher labour productivity, better communication within an organisation and higher employee satisfaction.

An important finding of the study is also the confirmation of a strong relationship between the occurrence of cognitive and behavioural changes, and organisational performance. In this way the study also recognises links between the organisational performance on one hand and systematic information acquisition and knowledge creation on the other. Managers interested in effectiveness of their organisations should be aware of these learning and knowledge creation processes and introduce them in a systematic way.

It is worth to note that according to the study information interpretation processes are not significantly associated neither with the occurrence of cognitive and behavioural changes nor the organisational performance. Nevertheless, they are significantly related to the extent of knowledge creation. Therefore, managers should be aware that if they want to encourage knowledge creation information interpretation should be introduced in more systematic way as well. Nevertheless, in such cases no significant changes in cognition, behaviour and organisational performance could be expected.

The key message for managers is that for the organisational success it is not enough (1) to establish processes and systems for acquiring the information from the environment, to exchange information with business partners, to acquire information about new products and services in the industry, or to search for advice of external experts, but it is also necessary (2) to establish processes, which enable continuous experimenting for new products and services, brainstorming, testing new ways of doing things, and continuously evaluating experiments and new ideas.

8.2. Research limitations and suggestions for future research

The most serious limitation of the study, which should be mentioned when considering research methodology, is a common method variance (CMV). CMV might be quite problematic due to its possible influence on research findings resulting from artifactual covariance in relationships between independent and dependent variables in the model. In

the research we approached reducing the high susceptibility to common method variance by following the instructions of Sharma *et al* (2009) - we introduce concrete and verifiable measures of behavioural and cognitive changes and company performance, and implement different scale and anchor formats.

Another important limitation of the study is also a relatively low response rate. On one hand 247 completed questionnaires allow the estimation of a quite complex conceptual model, but to achieve the fit between the data and the model indicators should be aggregated. On the other hand, the number of completed questionnaires does not allow cross-validation of the model. Cross-validation remains a task for future research in this field.

To improve reliability of the study mixed method approach might be a reasonable solution for further research. Among five purposes for using the mixed method approach Caracelli and Greene (1993) recognise triangulation and complementarily. The aim of triangulation is to increase the validity of the study's results (Greene *et al*, 1989) and the aim of complementarily is to measure different, but overlapping features of the phenomenon, i.e. by using one method it is possible to outline, explain, or upgrade the results of the other method.

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